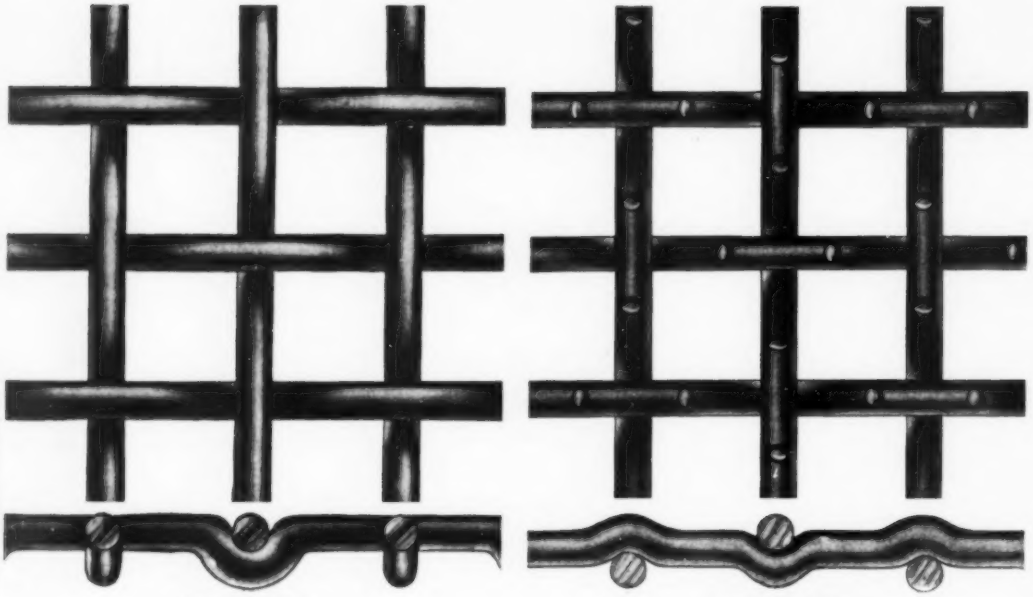
PIT AND QUARRY

AUGUST 1950

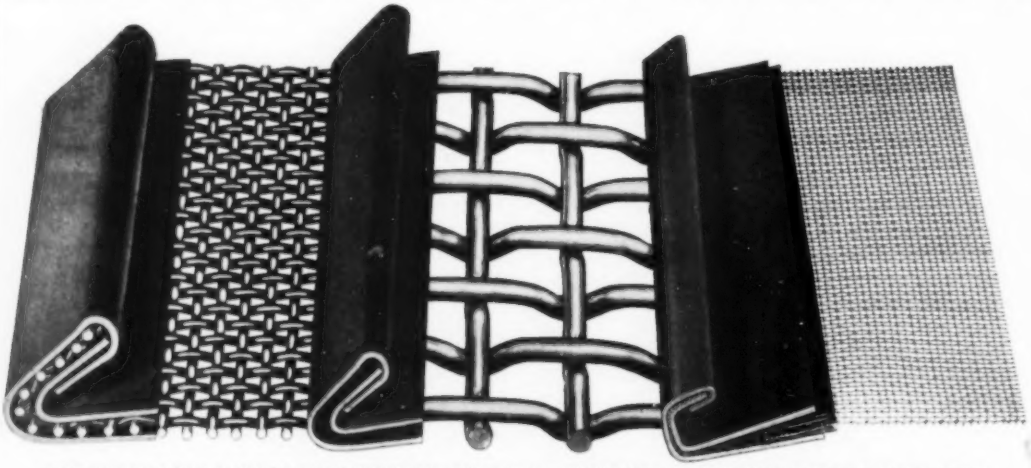


STA-SMOOTH *ARCH-CRIMP*

SUPER-LOY VIBRATING-SCREEN SECTIONS

SUPER-HARD - - - SUPER-TOUGH - - - SUPER-STRONG

SUPER-LOY SCREENS are made from a high carbon steel specially alloyed to withstand abrasion longer — endure vibration better — resist fatigue to the utmost

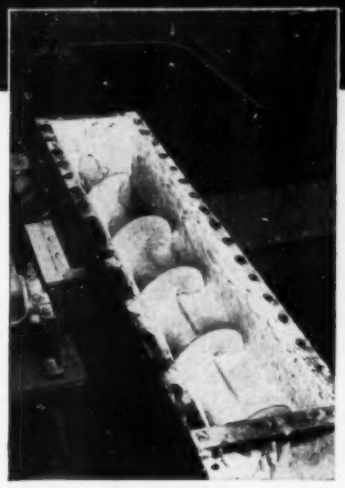


ORDER LUDLOW-SAYLOR HOOK-STRIPS FOR ALL TENSIONED VIBRATING-SCREEN SECTIONS.

THE LUDLOW-SAYLOR WIRE COMPANY

634 S. Newstead Ave. ST. LOUIS 10, MO.

LINK-BELT
SCREW CONVEYOR
is Outstanding . . .



Top illustration: 12" diameter Helicoid (screw) Conveyor delivering screened mixed clay to four 12" diameter reversible Helicoid Conveyors discharging into 16 batch bins. Lower illustration: Hydrated lime from bottom of reserve storage silo being conveyed to bucket elevator by Link-Belt Helicoid (screw) Conveyor.

Link-Belt originated and is the largest producer of continuous rolled Helicoid (screw) conveyor. Link-Belt also manufactures many other types of screw conveyors, including sectional flight, in a wide range of diameters and gauges, and in various metals, including stainless steel for conveying jobs where a sanitary metal is desirable. All necessary components such as collars, couplings, hangers, troughs, box ends, flanges, thrusts, drives, etc., are also available to give you one source of supply.

Link-Belt screw conveyors are compact, occupying less space than many other types of conveyors and therefore can be adapted to close clearance locations. Loading is simple—thru spouts or from adjacent conveying mediums. Covers and joints are tight, and dust seals and spring cover clamps keep dirt out, dust inside. Installation and operating costs are low.

Link-Belt engineers will be pleased to study your conveying problem and recommend a conveyor to suit your specific needs. Contact our nearest office for unbiased recommendations.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities.

11,874

LINK-BELT

SCREW CONVEYORS

PIT AND QUARRY, August, 1950, Vol. 43, No. 2. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $3 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $2 additional for each year. Single copy 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879.

ROCK RATED!

THE NEW **P&H** MODEL 955-A (2½ YDS.)

with *MAGNETORQUE** swing

Watch this new machine get its teeth into a rock job and see what "rock-rated" really means to you. It's *designed* . . . every inch from boom point to crawler shoes . . . to make rock handling easier . . . more profitable for you.

Unbeatable—point for point

P&H Magnetorque eliminates swing friction clutches . . . their troubles and replacement costs. It gives you smoother, faster swings . . . for the life of your machine.

Greater Stability gives you more power at the tooth point . . . and greater work capacity.

Direct Acting Hydraulic Control . . . easier on machine, easier on operator . . . smoother and greater holding power through full wrap brakes and clutches.

P&H Rapid Reversing Planetary Chain Crowd gives you snappier dipper action. It's more accurate. And crowd chain outlasts 25 to 30 crowd cables.

Get the facts about P&H all-welded strength and Added Values! The 955A is a 2½ yd. version of the P&H 1055 (3 yd. shovel) . . . the machine that has set new low-cost production records everywhere. Write for Bulletin X122, today.

*Trade-Mark of Harnischfeger Corporation for electro-magnetic type clutch.

P&H EXCAVATORS
4451 West National Ave.
Milwaukee, Wisconsin
HARNISCHFEGER CORPORATION

EXCAVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS and ELECTRODES • SOIL STABILIZERS • CRAWLER and TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

THE HARD ROCK LUG

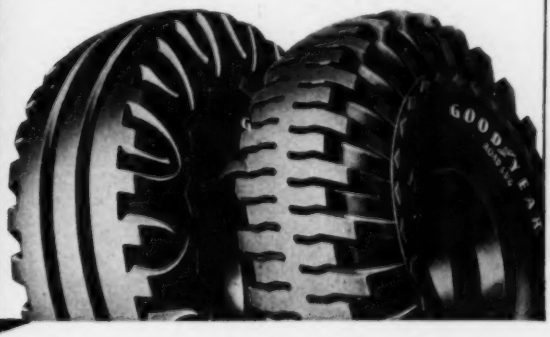
Super-tough champ for all types of rock work

THE HARD ROCK RIB

Companion tire for front wheels in rock work — easier steering, smooth rolling, same cord body, same shoulder and sidewall as Hard Rock Lug.

THE ROAD LUG

Remarkable dual-purpose tire operates OFF and ON the road. Combines off-the-road toughness and traction with on-the-road mileage and economy.



1st choice for low-cost rock hauling

EXPERIENCE proves that Goodyear's Hard Rock Lug has no equal for cutting costs on tire-killing rock work.

Specially designed to meet your needs, the Hard Rock Lug has an extra-thick undertread to protect its extra-tough carcass against bruising—tread and sidewalls are armored against cuts and rips by big husky lug bars—its tread is self-cleaning, always provides maximum traction.

For premium performance—rock-bottom economy on any type of rock work—Goodyear's Hard Rock Lug is your best bet. So remember, always BUY and SPECIFY Goodyear—*it pays!*

Road Lug—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

These 3 Features Reduce Sizing Costs

Ripl-Flo SCREEN

"Does an excellent job of sizing. No trouble."

—That's what Mr. George Bozich, owner and manager of Monon Crushed Stone Co., Monon, Indiana, has to say about the *Ripl-Flo* vibrating screen shown above — one of four Allis-Chalmers screens installed in this crushing plant.

1. BALANCED CIRCULAR MOTION to every part of screen surface on *Ripl-Flo* screen utilizes every sq ft of cloth area . . . results in high capacity and economy.

2. EASE OF MAINTENANCE Only two bearings to lubricate instead of four! It's easy to tension or change screen cloth because clamping plate tension bolts are easily accessible — no stationary frame in the way.

3. LOW MAINTENANCE and initial cost. Use of precision bearings assures long bearing life. Compact design eliminates outer support frames, reducing initial costs.

Why not find out first-hand how you may be able to reduce costs on your job? The Allis-Chalmers representative in your area is an expert on screening equipment. Call him, or write direct for **Bulletin 07B6151B.** A-3091

ALLIS-CHALMERS, 974A SO. 70 ST. MILWAUKEE, WIS.

Ripl-Flo and *Texrope* are Allis-Chalmers trademarks.

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Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Motors | Controls | Texrope Drives | Vibrating Screens | Crushers | Kilns, Coolers, Dryers

Euclid

Service - YOUR KEY

TO LOWER COSTS!

Engineered and built for heavy off-the-highway hauling, "Eucs" are first choice for open pit mining and quarry operations, and for construction and industrial work. Proved on hundreds of the toughest jobs, Euclid low cost performance is backed by a world wide distributor organization with competent personnel and stocks of genuine Euclid parts.

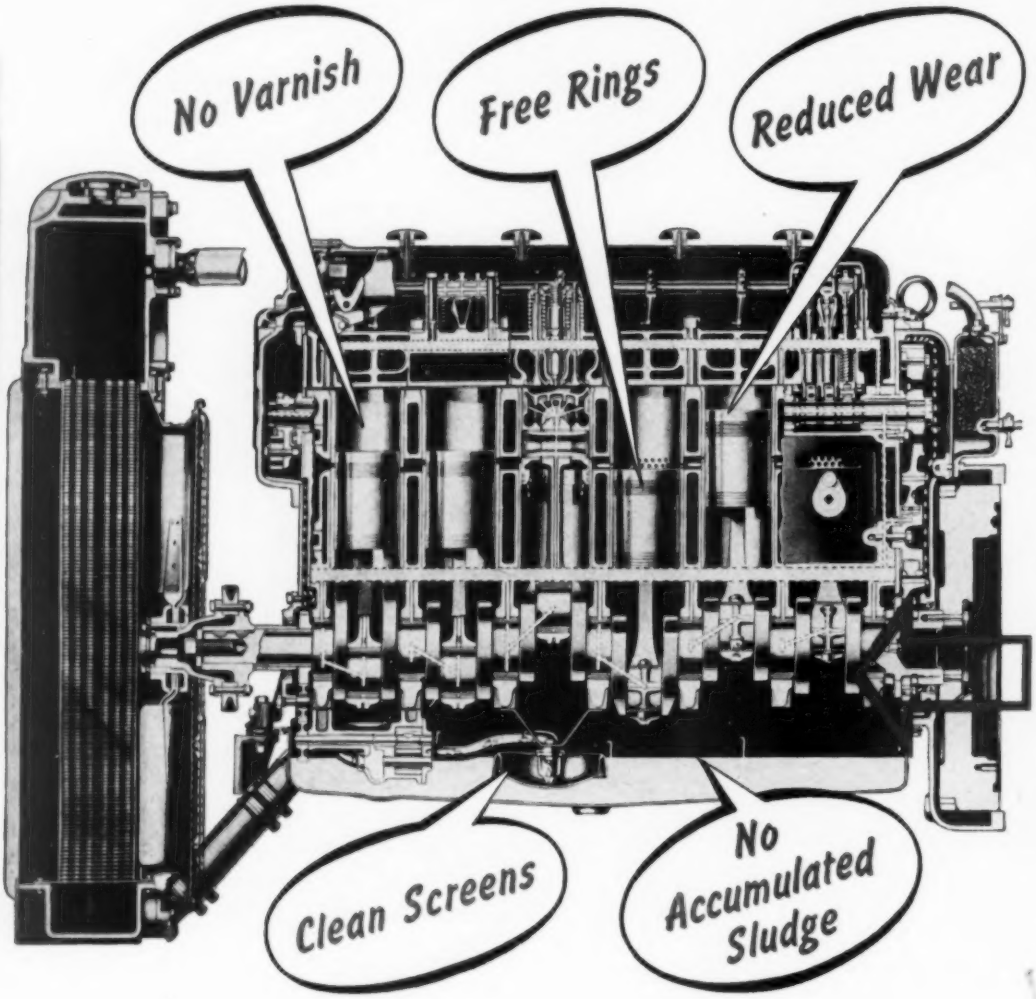
Euclid owners know they can depend on prompt and efficient service whenever needed to keep down-time and maintenance costs at a minimum. Your Euclid distributor will be glad to show you how dependable performance and fast on-the-job service can help to lower your hauling costs and keep your work moving on schedule.

First in field performance—first in service... these are Euclid plus values that add up to customer satisfaction.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS Move the Earth

In SEVERE DUTY..
Can Double Engine



SINCLAIR HEAVY

Your Nearest Supplier of Sinclair Products Will Gladly Arrange for Lubrication

. New *SUPER TENOL* Life Between Overhauls

New Sinclair SUPER TENOL is an oil specially developed to eliminate the high maintenance costs so frequently encountered in both types of "severe duty" service: — 1. High temperature, high speed, over-load; and 2. Low temperature, light load, long idle, stop-and-go.

Under these abnormal conditions, operators report new SUPER TENOL has more than DOUBLED the life of their equipment between overhauls.

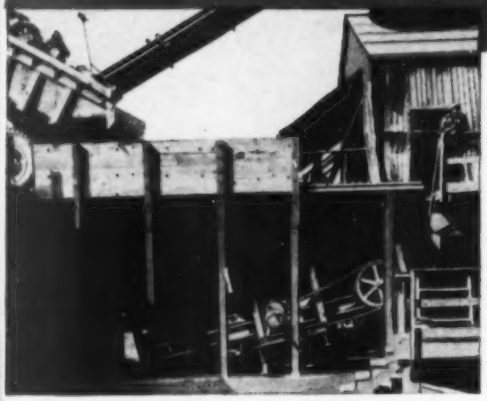
If you operate diesel-powered or gasoline equipment in severe duty service it will pay you to change to new SUPER TENOL now—to keep equipment in operation many more days each year, to save time, labor and money.

DUTY LUBRICANTS

Counsel or Write to Sinclair Refining Company, 630 Fifth Avenue, New York 20, N. Y.

TELSMITH

more economical feeders



NEW ENTERPRISE STONE & LIME CO., ASHCOM, PA.—36-in. x 10-ft. Telsmith Heavy Duty Apron Feeder takes 15-ton loads; feeds a 25-B Telsmith Primary Crusher.

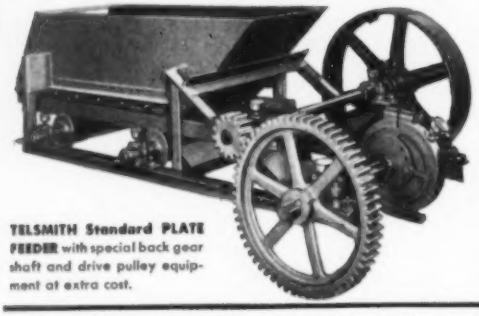
● Keep your conveyors, screens and crushers working smoothly and at full capacity. Telsmith Apron or Plate Feeders insure steady, uniformly regulated flow of material to entire plant—boost your output and cut cost of up-keep.

APRON FEEDERS are self-contained units on heavy structural steel frames. **Heavy-Duty Apron Feeders**—with carbon, or manganese steel flights—handle the toughest jobs, such as feeding primary crushers, either jaw or gyratory. **Standard-Duty Apron Feeders**—equally sturdy, but weigh less. Apron Feeders are made in 24-in. to 72-in. widths, with capacities from 25 to 700 tons per hour. Furnished with heavy steel hoppers, at extra cost.

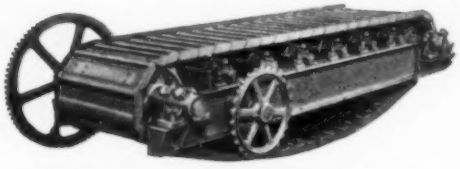
PLATE FEEDERS are simple in design—sturdy in construction. Adjustable stroke regulates capacity. Made in both Standard and Heavy-Duty models; widths 16-in. to 48-in.; capacities 12 to 400 cu. yds. per hr.

Send for Bulletin 266

F-1.



TELSMITH Standard PLATE FEEDER with special back gear shaft and drive pulley equipment at extra cost.



TELSMITH Standard-Duty APRON FEEDER—Raised edges of its ⅜-in. steel flights prevent spillage.

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

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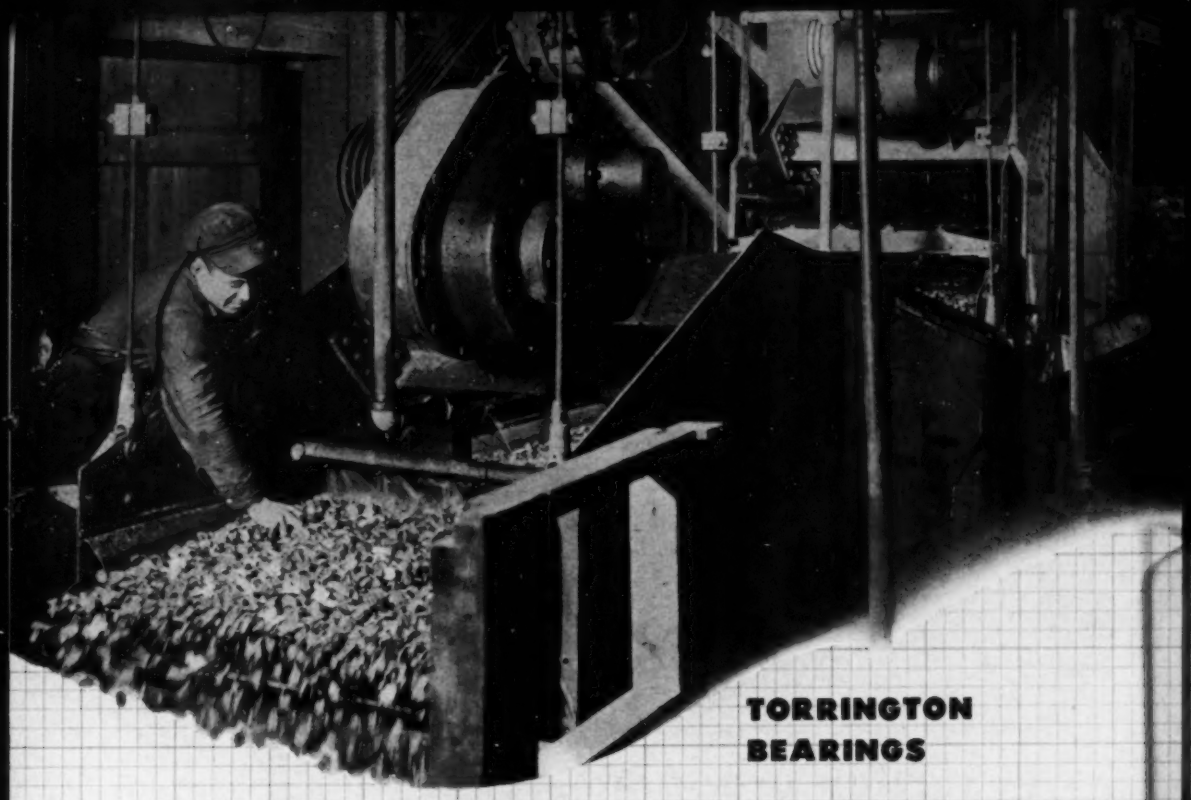


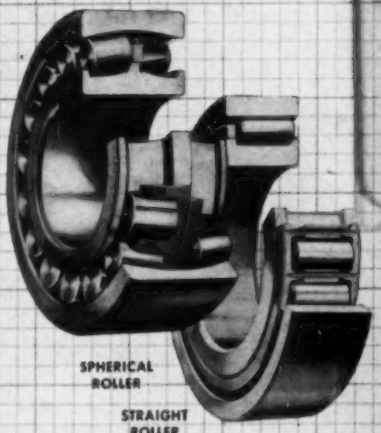
TORRINGTON BEARINGS

pass a tough screen test

Vibrating screens give a design engineer a tough problem in bearing selection. Satisfied with nothing less than the best screen performance, Allis-Chalmers engineers have devoted years of research in close cooperation with bearing manufacturers to develop precision bearings ideally suited to each specific screen application.

For example, in many Allis-Chalmers Ripl-Flo screens, two Torrington Spherical Roller Bearings are used to support the accurately-balanced eccentric shaft that imparts a perfect circle vibratory motion. Many Allis-Chalmers Low-Head screens utilize four Torrington Straight Roller Bearings to support the counterweighted shafts providing the straight-line vibratory motion. The results are high performance and low maintenance in both models.

It may pay you, too, to consult our engineers' special knowledge of all major bearing types in connection with *your* friction problems.



SPHERICAL ROLLER

STRAIGHT ROLLER

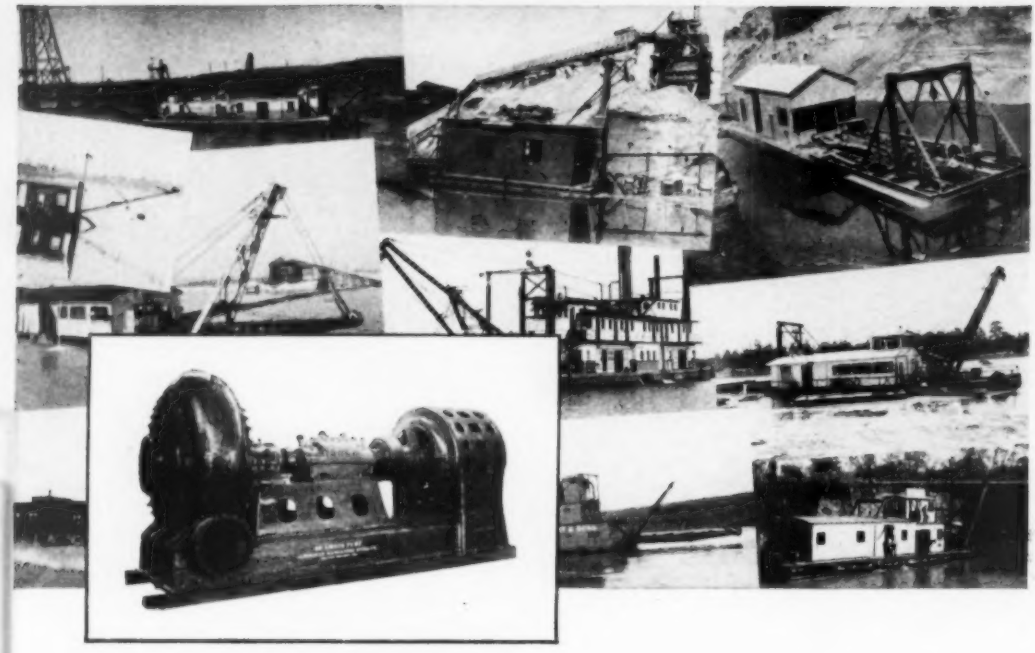
THE TORRINGTON COMPANY

South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON BEARINGS

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS



in suction dredging . . .

More owners buy AMSCO® than any other pump!

Here's why so many operators find that AMSCO Pumps make dredging more profitable

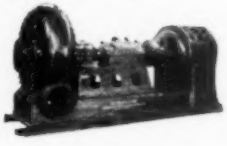
The dredges shown above are typical of over a thousand that have one feature in common . . . they're equipped with Amsco Manganese Steel Dredge Pumps. In fact, almost any operator will tell you that an Amsco Pump is the one to buy.

Why this outstanding preference? First, because profitable dredging requires high efficiency . . . second, because service records prove beyond question that tough manganese steel is the answer for long-wearing, trouble-free pump performance. *An Amsco Pump wins the profit battle against impact and abrasive wear.*

When you handle aggregate with equipment that *lasts longer* . . . that does the job with *greater efficiency* . . . you make *higher profits.* That's why more Amsco Manganese Steel Dredge Pumps are in use than any other make or type.

Amsco has the pump you need—large or small. Write today for the facts.

AMSCO®
Dredge Pumps



AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
396 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.

GREAT NEW ADVANTAGES IN TRUCK MIXERS

achieved with Chrysler Industrial Engines and Chrysler gýrol Fluid Drive

Reverse rotation of the drum without throwing damaging shocks and impacts into the transmission, engine and other parts of the machine!

No shear pins to replace! Smoother operation! Lower maintenance costs! Longer life! These are only a few of the advantages Chrysler Industrial Engines with gýrol Fluid Drive have brought to operation of truck mixers.

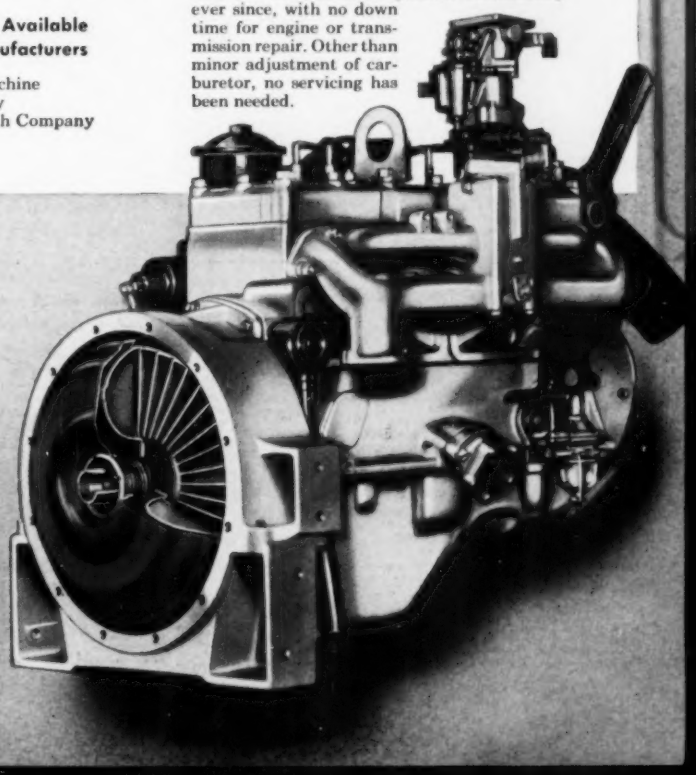
In addition, Chrysler Fluid Coupling prevents engine stalling, reduces clutch wear, eliminates jolts and gear rattle, simplifies starting from standstill with excessive load, gives gradual oil-smooth acceleration—opens a whole new field of improved operation for gasoline-powered equipment. See your Chrysler Industrial Engine Dealer or write us. ***Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.***

Chrysler gýrol Fluid Drive Now Available For Truck Mixers From These Manufacturers

Blaw-Knox Division of Blaw-Knox Company
Chain Belt Company
Jaeger Machine Company
T. L. Smith Company

A Typical Experience

Five years ago, a Rex Moto-Mixer equipped with Chrysler Industrial Engine and gýrol Fluid Drive was placed in operation by the Tews Lime and Cement Company of Milwaukee. The unit has been operated continuously ever since, with no down time for engine or transmission repair. Other than minor adjustment of carburetor, no servicing has been needed.



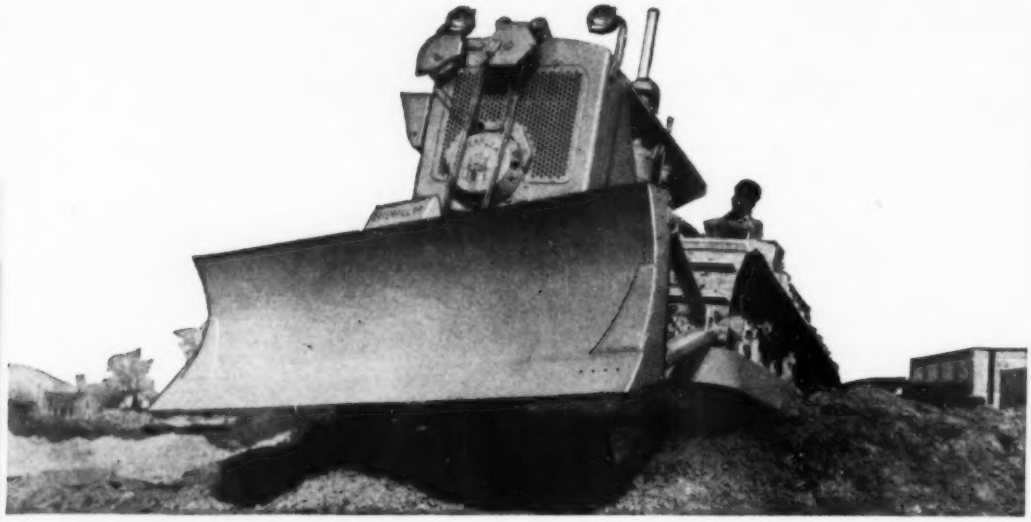
Chrysler gýrol Fluid Drive is built integral with Chrysler Industrial Engines. Its cost is only a few dollars more than the conventional flywheel which it replaces.

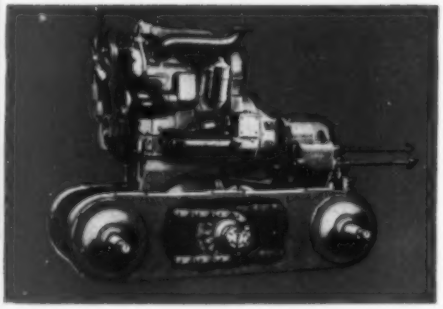
CHRYSLER

Industrial Engines and Power Units

HORSEPOWER WITH A PEDIGREE

Rough, Rugged, Heavy Duty Lubes for every equipment need!





FREE — A helpful new booklet — Earth Moving and Construction Machinery lubrication. Above cutaway view is typical of illustrations found in this new 50-page book dealing with proper lubrication in the construction industry. Write today for your copy.

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Sixty Wall Tower, Room 660
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Please send me without obligation your new booklet entitled "Earth Moving and Construction Machinery Lubrication."

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Look over this complete line of all-weather . . . all-purpose lubricants!

NAME ANY LUBRICATION PROBLEM you can think of! There's the right grade and type of Cities Service lubricant to do a real job for you. This performance-tested line of quality products will help speed your heavy duty operations, cut maintenance costs, prevent equipment breakdowns. Get in touch with the nearest Cities Service office to learn how these high grade lubricants can help you.

- **Trojan All-Weather . . . All-Purpose Greases**
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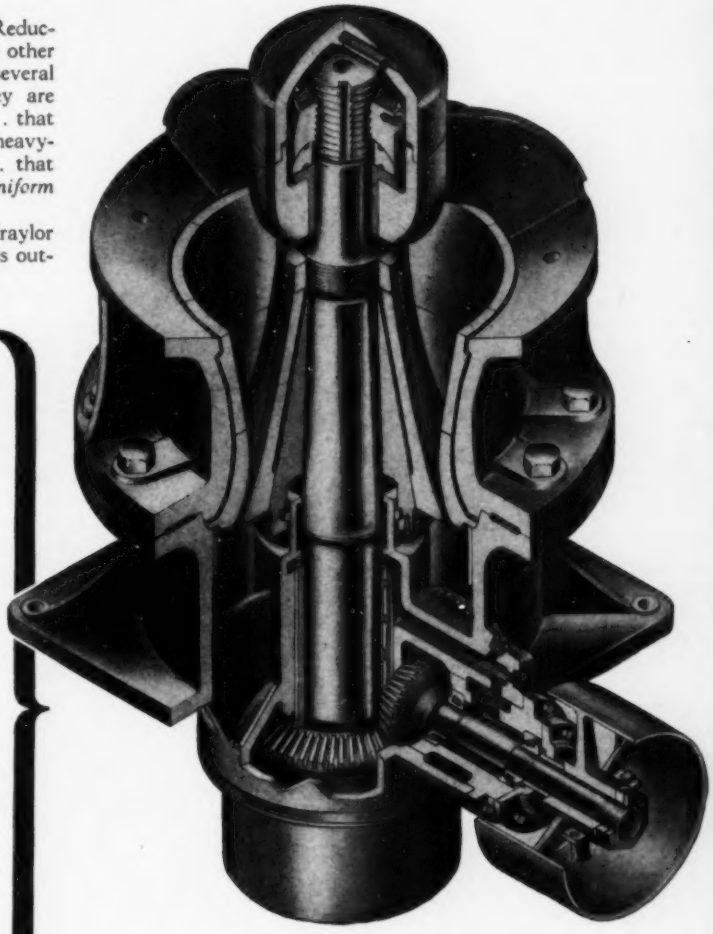
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Let's be SPECIFIC about reduction crusher Efficiency

We believe that Traylor TY Reduction Crushers are superior to other secondary fine crushers in several ways. We believe that they are *more economical* to operate . . . that they are *more dependable* in heavy-duty, continuous service . . . that they produce a better, more *uniform product*.

Now let's look inside a Traylor TY to see how it achieves this outstanding operating efficiency.



TRAYLOR'S CURVED CONCAVES AND BELL HEAD

produce better aggregate at less cost per ton

LOWER POWER COST

Traylor's curved concaves and bell head apply power as a *direct* crushing force. The eccentric motion of the bell head exerts power *directly counter* to the curved surfaces of the concaves. This stops lifting and churning of material . . . cuts down power loss . . . reduces power costs per ton.

GREATER DEPENDABILITY

Traylor's curved concaves and bell head *eliminate choking and packing*. Each succeeding feed zone is of greater capacity than the preceeding zone. As the material passes thru the crusher it has free fall from each stage of reduction to the next. Costly downtime is avoided . . . lost production is saved.

HIGHER QUALITY PRODUCT

Since there is no choking or packing . . . *no lifting and churning* . . . material flows evenly thru the crushing chamber of a Traylor TY Reduction Crusher. This reduces the percentage of waste fines. The curved crushing surfaces produce a more uniform product at less cost per ton.

WRITE FOR FREE BOOKLET

Many other outstanding design features account for the low maintenance costs and dependable service of a Traylor TY Reduction Crusher. They are fully described in our new Bulletin #5112. Write for your free copy today.

TRAYLOR ENGINEERING & MANUFACTURING CO.
177 Mill St., Allentown, Pa.

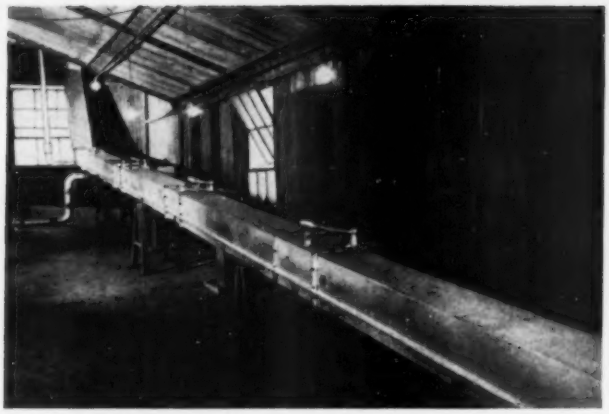
Sales Offices: New York, N. Y., Chicago, Ill., Los Angeles, Calif.
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P. Q.

Traylor

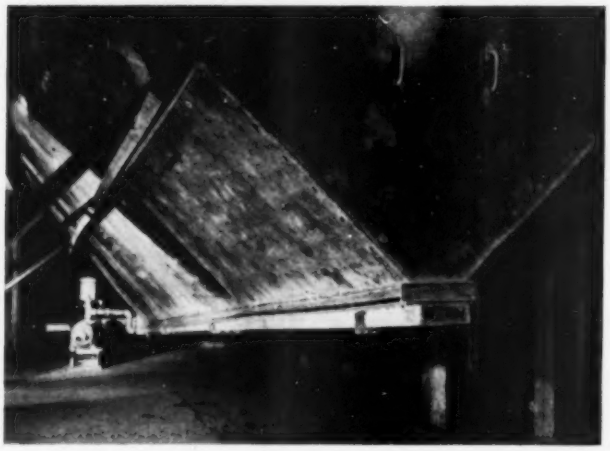
Rotary Kilns, Coolers and Dryers
Grinding Mills . Crushing Rolls
Jaw, Reduction and Gyratory Crushers

A "TRAYLOR" LEADS TO GREATER PROFITS

AIRSLIDE MAKES "EASY-GOING" FOR PULVERIZED MATERIALS



F-H Airslide Conveyor, enclosed type, conveys raw materials from preliminary grinding mills and delivers it, through three side-discharge valves, to bin below. Air piping from 1½ hp. fan is at far end of Airslide.



F-H Airslide, open type, installed in bottom of raw-material storage and blending bin at Giant Portland Cement Company. The 5-hp. blower in the background furnishes the necessary air.

Once again, the F-H Airslide Conveyor has proved to be the best way to move dry, pulverized material.

The Giant Portland Cement Company, Egypt, Pa., installed an Airslide system . . . and discovered, like many other companies, that it had cut handling costs. Hazards to workmen have been eliminated. Power costs are negligible. There are no breakdowns and costly repairs. Raw materials, aerated to flow like water, travel from grinding mills to bin, and from bin to elevator at rate of 90 tons an hour. Power requirements? One blower and one fan: total 6½ hp.

The side-discharge valves installed in the Airslide above the bin may be set either to direct entire material flow through one spout, or divert any portions of the material stream to obtain a desired distribution to the bin below the floor.

The Airslide Conveyor is just about tops in simplicity. There is no need for lubrication or costly down-time. There are no moving parts in the conveyor itself. An Airslide can't be equalled for flexibility in plant design.

If your conveying costs are cutting into profits, call in a Fuller representative. He'll survey your plant and submit recommendations without obligation on your part. His advice may well be your key to more efficient and profitable operation.

FULLER COMPANY, Catasauqua, Pa.
120 So. LaSalle St., Chicago 3
420 Chancery Bldg., San Francisco 4

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

fuller

FH-13

Portal Lucky Peak Tunnel
26' Bore inside steel

Eimco 104 RockerShovel at Lucky Peak

Lucky Peak Tunnel Project near Boise, Idaho, uses an Eimco 104 RockerShovel for mucking out the 26' bore.

"The 104 is faster and more efficient," says project superintendent Paul C. Guinn, a veteran tunnel driver running the job for the Macco Corporation and Puget Sound Bridge & Dredging Company joint contractors. Lucky Peak is Mr. Guinn's 59th tunnel.

The 104 loads the 8' rounds of blocky basalt rock in three hours using a 1¼ yard rock bucket . . . an average of twenty WD-60 Dumptor loads per hour.

Eimco 104 RockerShovels will cut the cost of loading on your job, too. Write for more information.

"In comparing loaders, the Eimco is a mucking machine," says P. C. Guinn, project manager.

EIMCO

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

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AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD

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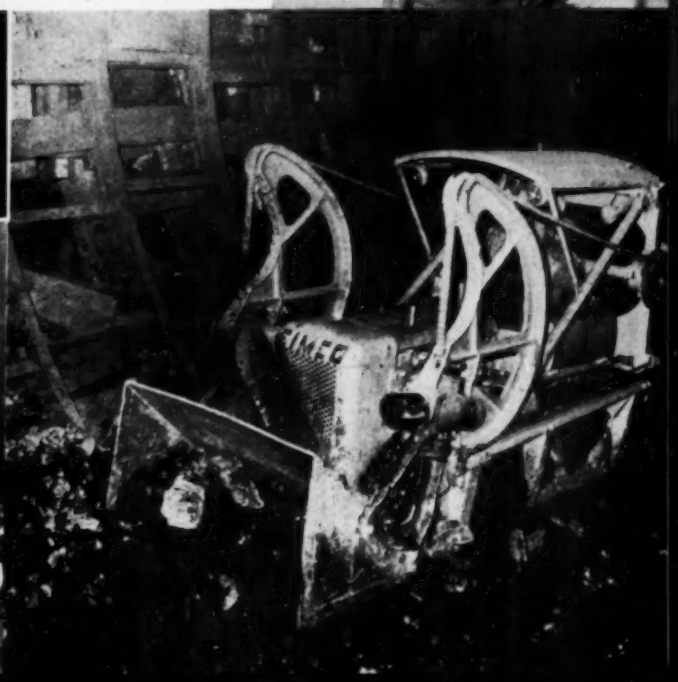


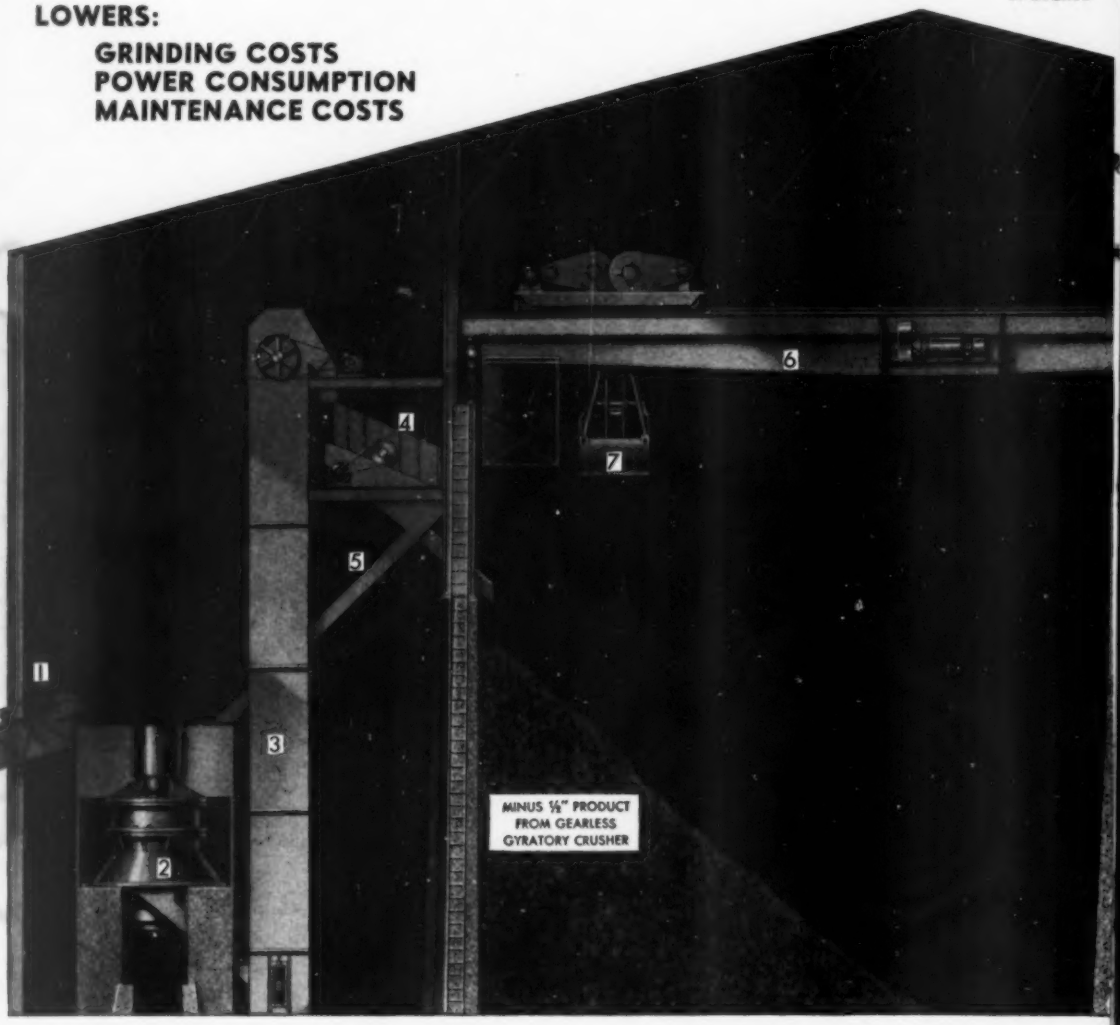
KENNEDY STRATIFIED AIR

FOR RAW STONE, ORE

(Patents

LOWERS:

GRINDING COSTS
POWER CONSUMPTION
MAINTENANCE COSTS



1 BELT CONVEYOR — FEED TO CRUSHER
2 GEARLESS GYRATORY CRUSHER
3 ELEVATOR
4 VIBRATING SCREEN
5 OVERSIZE RETURN CHUTE
6 TRAVELING CRANE
7 CLAMSHELL BUCKET
8 MILL FEED HOPPER
9 WEIGHING FEEDER
10 STRATIFIED AIR SWEPT TUBE MILL
11 RADIAL FLOW CLASSIFIER

THIS UNIT PRODUCED 94% PLUS THROUGH 325

Ask for One of Our

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

SWEPT TUBE MILL SYSTEM

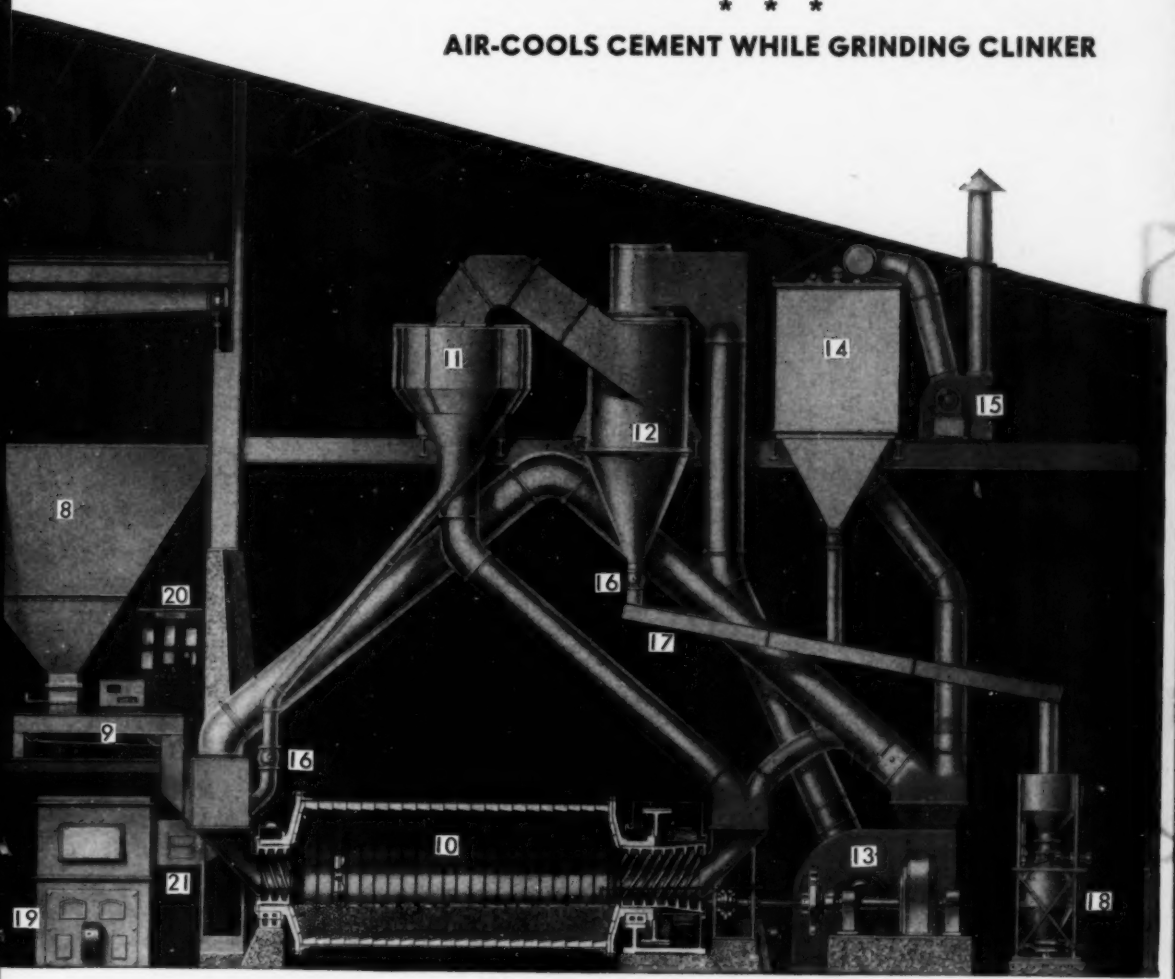
AND CLINKER GRINDING

Pending)

DRIES AND GRINDS SIMULTANEOUSLY

* * *

AIR-COOLS CEMENT WHILE GRINDING CLINKER



12	CYCLONE COLLECTOR	17	FINISHED MATERIAL CONVEYOR
13	MILL EXHAUSTER	18	AUTOMATIC PNEUMATIC TRANSPORT PUMP
14	DUST FILTER	19	HOT AIR FURNACE
15	DUST FILTER EXHAUSTER	20	INSTRUMENT AND CONTROL CUBICLE
16	ROTARY AIR LOCKS	21	AUTOMATICALLY CONTROLLED TEMPERING AIR DAMPER

FINISHED MATERIAL TO STORAGE SILO

MESH WHEN GRINDING CLINKER 2" AND FINER.

Engineers to Call

2 PARK AVENUE • NEW YORK 16, N. Y. FACTORY: DANVILLE, PA.

IT COSTS LESS TO OWN THE BEST!

View From Kiln Feed Platform Between The Kilns

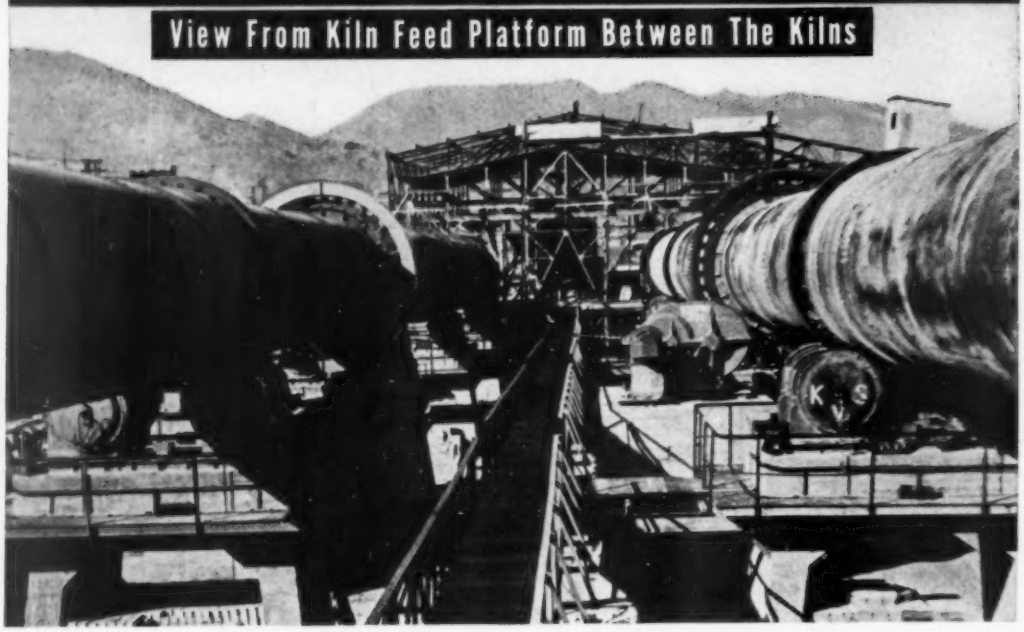


ILLUSTRATION SHOWS TWO LARGE KVS KILNS WITH SELF-ALIGNING BEARINGS

CAPACITY UNLIMITED!

KENNEDY KILNS ARE BUILT TO LAST

featuring:

ALL-WELDED SHELLS WITH SPECIAL THICK SECTION UNDER TIRES

CARRYING ROLLERS MOUNTED IN OVERSIZE SELF-ALIGNING BEARING TO GIVE LOW SPECIFIC BEARING PRESSURE.

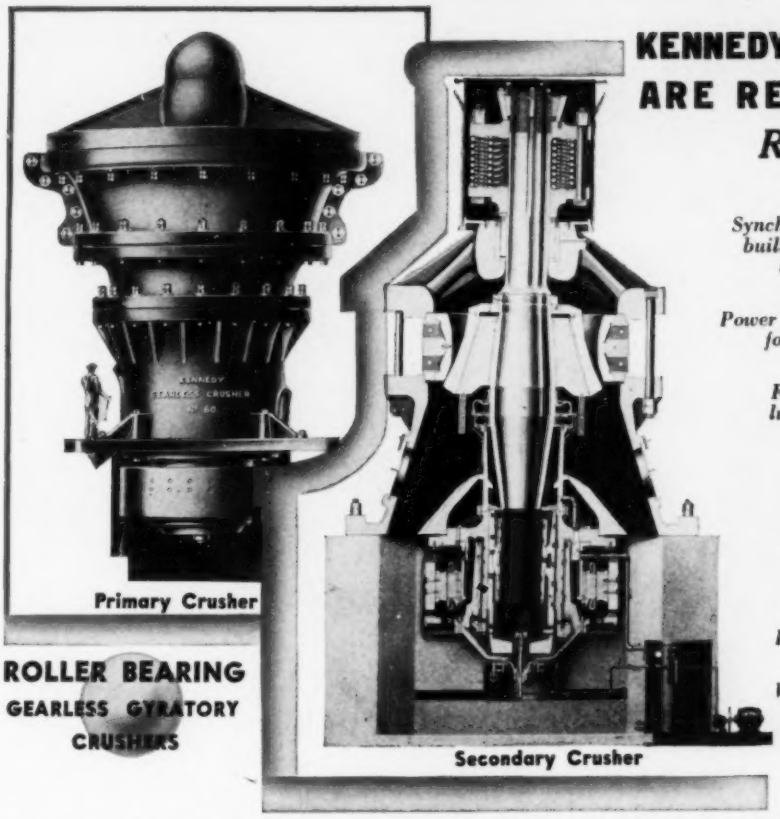
Let a KVS engineer review your plant needs and recommend the proper design and size kiln to meet your needs. Long life and dependable service distinguish all KVS products. It's the users who say "It Costs Less To Own The Best."

Send for bulletin describing KVS Kilns, Coolers & Dryers

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

TWO PARK AVENUE, NEW YORK 16, N. Y. **FACTORY: DANVILLE, PA.**

IT COSTS LESS TO OWN THE BEST!



ROLLER BEARING
GEARLESS GYRATORY
CRUSHERS

KENNEDY CRUSHERS ARE REALLY . . . *RUGGED!*

Synchronous motor built into pulley assembly

•

Power applied ONLY for crushing

•

Force-feed lubrication

•

No gears to waste power

•

Added power at no added cost

•

Quiet — smooth Frictionless action

•

Varying capacities to serve every purpose

Designed and built to produce, economically and consistently, maximum loads of uniform products. Assures efficient service with minimum "time off for repairs" under the most severe operating conditions.

Costs less in the long run because it has a larger capacity; uses less power; holds repair bills to a minimum; produces more and better rock tonnage, faster and at lower cost.

Kennedy Crushers are made in various size units delivering from 12 to 3600 tons per hour. Engineered to serve your exact needs. Fifty years experience in the building of heavy duty crushers is your assurance that "It Costs Less To Own The Best" when you use KVS equipment.

Send for bulletins describing, fully, all types of KVS crushers

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION
TWO PARK AVENUE, NEW YORK 16, N. Y. FACTORY: DANVILLE, PA.

DRESS UP!

with Bemis Printed Multiwalls

Bemis printing is bright, colorful, unique. If you have an intricate, multi-color job, that is our special dish. Such printing can come only from the modern equipment and the long experience and skill in designing, plate-making and printing that Bemis provides. Ask your Bemis man.

Bemis

BEMIS BRO BAG COMPANY

if it's hot...

put it on a Republic hot material conveyor belt

● Yes, it makes sense. Most hot material conveyor belts just can't take it because their fabric muscles dry up, char and break. Republic Hot Material Belts are built with **extra** capacity. They have specially treated carcasses and insulating outside covers that resist heat and oxidation . . . covers that outwear and outlast standard belts.

There's a special Republic Hot Material Belt made for your needs, and your local Republic Distributor knows exactly the one to give you most service at lowest cost. Contact him today or write direct for information. Remember, Republic Rubber has been **the** specialist in the field for nearly a half century.

Mr. Luis Zork, President, Zork Hardware Company, Republic Distributor in El Paso, Texas, supplied International Minerals & Chemical Corporation at Carlsbad, New Mexico, with the Republic Super Excelo Hot Material Belt shown above. This belt operates 20 hours per day, carrying hot (325° F.) potassium salts. Conditions are grueling, yet performance records: "excellent!"

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

Precisely matched FOR

How Peoria Concrete planned plant and equipment for profitable production

The washer, built on top of a hill, is so constructed that the "Caterpillar" D6 Tractor-Scraper team can dump its load of gravel into a hopper feeding the washer. The grades in the pit are from 5% to 30% favorable, so a full load can be picked up quickly. Except for 200 feet of about 20% grade, the haul to the washer is fairly level. The return trip to the pit is made on a back road. Since the route is circular, the "Cat" unit is headed for the dumping point—no time is wasted turning around to scrape a fresh load!

bigger production

THERE wasn't any guesswork when the plant of the Peoria Concrete Construction Co., Peoria, Illinois, was laid out. Owner Herman Ziegele *planned* every step of the operation for maximum production. He also *planned* ahead in picking the equipment to fit the job. This perfectly matched "Caterpillar" D6 Tractor with No. 60 Scraper haul up to 450 tons of washed sand and gravel a 9-hour day to keep the plant profitably busy.

Engineered to work together, this big yellow D6 Tractor and No. 60 Scraper eat up yardage at low cost for Peoria Concrete. The D6 has power aplenty to work loose gravel, load it without help and average 7 trips per hour on the 3/8-mile circular route. It has the maneuverability, too, to swing quickly into position for loading in the pit or dumping at the hopper. The No. 60, with scientific blade and bowl design, loads speedily and averages 6 cubic yards per load. Its open-bowl construction makes spotting easy at the plant. And its 'dozer-type ejection "rolls" out the gravel with dispatch.

Are your plant and equipment *planned* and *matched* for maximum production? Check up now and see. Your "Caterpillar" dealer has the know-how to be of real help. Call him today. Ask for job-proved facts about "Caterpillar" performance. Make a date for a demonstration of a matched "Cat" Diesel Tractor and Scraper in action!

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

LOOK UNDER THE HIDE

Fuel pumps are "Caterpillar"-designed and "Caterpillar"-built. Made of the cleanest high-chromium, high-carbon alloy steel obtainable, the pump plungers and barrels are diamond lapped. Pumps are heat treated to maximum hardness to give users thousands of hours of trouble-free economical service. There is an individual pump for each cylinder. Pumps are adjustment-free and completely interchangeable. Look under the hide for quality. It doesn't show on the outside—it shows up in performance.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

10c A TON MORE PROFIT
with Kue-Ken* Crushers

Low Bidding Depends on Low Cost Crushing

PLATES COST less than 1c per ton as compared to 10c per ton for previous crusher on same job.

KUE-KEN 30" x 9" CRUSHER shown is crushing hard river gravel and has run 18 months on the original jaw plates. They have not been turned once. When reversed should give an additional 14 months service. Jaw plates on previous crusher were completely worn out in three months time.

This Kue-Ken operates in closed circuit with a screen. 100% minus 1½" and 100% minus 1", depending on requirements. Capacity of plant 800 tons per 8 hours to 1½", about 50% through the crusher.

In 18 months operation 90% of total production has been 100% minus 1". The previous crusher was unable to produce anything finer than 1½".

18 sizes available 12" x 7" to 42" x 27".

Longer Jaw Plate Life and Bonus/Capacity gives lowest cost crushing to Kue-Ken users.

Write today for Bulletin 605

Your Nearest Western Dealer

P. L. Crooks & Co., Portland, Oregon
Caird Engineering Works, Helena, Montana
Lund Machinery Co., Salt Lake City, Utah
Migula & Co., Los Angeles, California

*Pronounced Que-Ken. U.S. and Foreign Patents Pending.

544 CHESTNUT ST. • OAKLAND 20, CALIFORNIA

STRAUB MFG. CO.

Kue-Ken Balanced Crushers	Rib Cone Ball Mills	Overflow Classifiers
Kue-Ken Simplex Crushers	Concentrating Tables	Feeders
Kue-Ken Gyratory Crushers	Overhead Eccentric Crushers	Screenwheel Classifiers

Wanta get hauling costs down to rock bottom?

DODGE trucks are "Job-Rated" to cut costs!

If your hauling costs are running too high, you need trucks that are built to fit your job. You need Dodge "*Job-Rated*" trucks.

Because they are "*Job-Rated*," Dodge trucks can really take it. From stem to stern, every chassis unit is engineered and sized to fit your hauling needs. This means thousands of extra miles of thrifty operation in rough, tough quarry work.

What's more, every Dodge truck is powered with a "*Job-Rated*" engine that gives you power to spare—plus maximum gas and oil economy.

Ask your Dodge dealer to show you a truck that will get your hauling costs down to "rock bottom." He'll show you a Dodge truck that's "*Job-Rated*" to fit your job and save you money.

With all their extra value **DODGE** "Job-Rated" **TRUCKS** are priced with the lowest

Construction

EXAMINE THESE FEATURES— PROVE TO YOURSELF THAT HYDROCONE CRUSHERS WILL DO A JOB OF FINE REDUCTION CRUSHING FOR YOU!

GOOD NEWS for crushing men! Now — you can meet fine reduction crushing requirements in a new, wider range of capacities. The line of *Hydrocone* gyratory crushers has been expanded by A-C to include sizes up to 84-in. diameter cone with a maximum receiving opening of 17-in.

With hydraulic product size control you can change product size *instantly*. Push-button operation on larger *Hydrocone* crushers; hand crank control on the smaller machines. No tools required.

Hydrocone crushers are available with fine, intermediate or coarse crushing chambers . . . offer a capacity range of 10 to 1000 tons per hour. The A-C representative in your area can give you more facts on this expanded line. A-3098

ALLIS-CHALMERS, 974A SO. 70 ST.
MILWAUKEE. WIS.

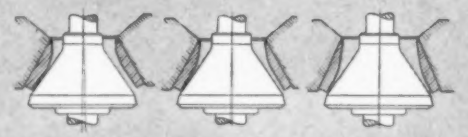
WOBBLE PLATE FEEDER distributes feed evenly . . . standard equipment on crushers with fine crushing chambers — can be supplied on others as well.

SLEEVE TYPE spider bearing is readily replaceable . . . greatly simplifies maintenance. Used on larger size *Hydrocone* crushers. Ball and socket type spider bearing supplied crusher sizes up to 48-in. In both types, lubricant is retained by an efficient seal enclosing the main shaft.

ONE-PIECE outer crushing surface is a concave ring cast of mantalloy. Necessity of zincing or clamping the concave ring in place is eliminated by ground-to-fit finish on the outer surface and the use of an effective self-locking device.

ONE-PIECE inner crushing surface, like the concave ring, is cast of mantalloy, designed for long wear. Complete contact of the ground inner surface with the steel head center eliminates zincing in all but the largest sizes. The mantle is held tightly in place by the self-locking head nut.

HIGH CAPACITY crushing chamber of any of the three standard types is designed to assure a continuous, uniform product. The shape of the mantle and concave ring, and the large adjustment range available, results in maximum life and minimum scrap when replacing parts. Special crushing chambers also available for special applications.



FINE CRUSHING CHAMBER | **INTERMEDIATE CRUSHING CHAMBER** | **COARSE CRUSHING CHAMBER**

THREE-PIECE step bearing supports the main shaft on the hydraulic piston. Designed to withstand crushing pressures much greater than those encountered in actual service.

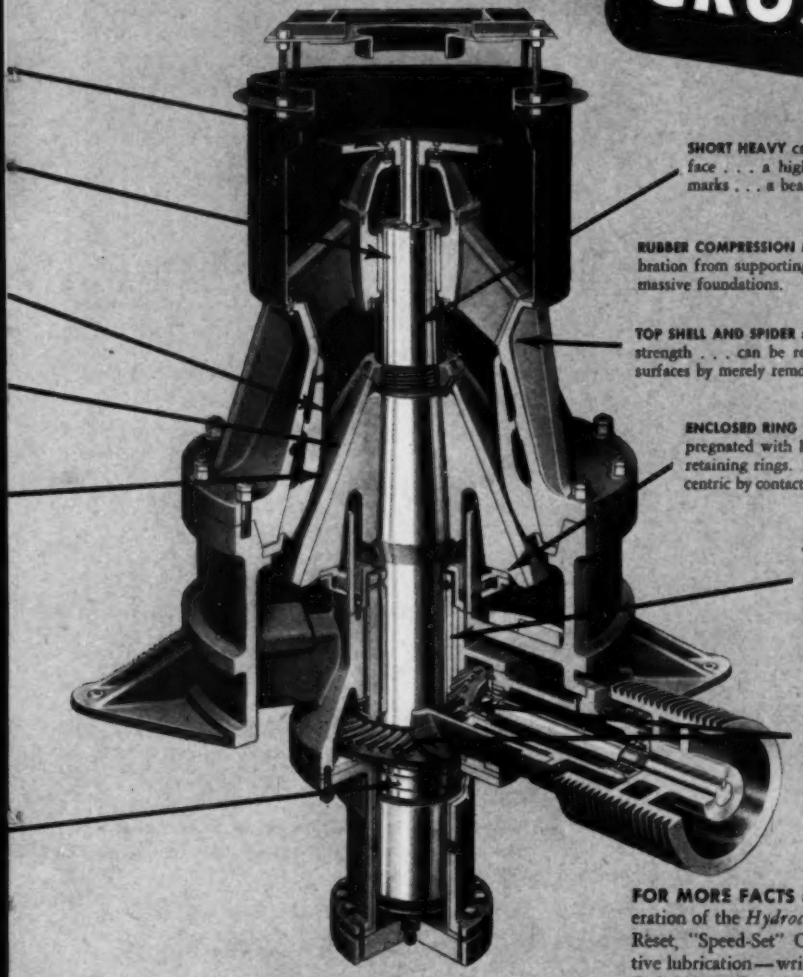
FULLY AUTOMATIC lubricating system consists of storage tank, pressure type filter, condenser type cooler, and motor driven oil pump. Flow and temperature switches in the oil line protect the crusher.

Mantalloy is an Allis-Chalmers trademark.

The 84-in. *Hydrocone* gyratory crusher has a 17-in. feed opening.

Details

HYDROCONE (FORMERLY TYPE R)* CRUSHERS



SHORT HEAVY crusher shaft has "cold-worked" surface . . . a highly polished finish free from tool marks . . . a bearing surface of the highest quality.

RUBBER COMPRESSION MOUNTINGS isolate operational vibration from supporting structure . . . eliminate need for massive foundations.

TOP SHELL AND SPIDER are cast in one piece for maximum strength . . . can be removed easily to replace crushing surfaces by merely removing nuts from joint studs.

ENCLOSED RING TYPE dust seal — a plastic ring impregnated with lubricant and held in place by two retaining rings. Dust is sealed from the crusher eccentric by contact of the plastic ring with dust collar.

BRONZE ECCENTRIC SLEEVE is easily changeable in the field. Various eccentric throws may be obtained through the use of different sleeves . . . again adding to the versatility of the *Hydrocone* crusher.

BEVEL AND PINION GEARS are of the spiral design in the larger sizes . . . provide greater tooth contact and smooth, trouble-free operation under the most severe conditions. Standard design bevel and pinion gears on the smaller sizes.

FOR MORE FACTS about the application and operation of the *Hydrocone* crusher—with Automatic Reset, "Speed-Set" Control and automatic protective lubrication—write direct to Allis-Chalmers for **Bulletins 07B7145A and 07B6006E.**

Hydrocone and *Speed-Set* are Allis-Chalmers trademarks.

*The term "Type R" by which these Allis-Chalmers crushers have been known has been changed to "*Hydrocone*." Hydro denotes the use of a static liquid, such as oil, used in the *Hydrocone* crusher for supporting and adjusting the height of the crushing cone. The principle of operation has not been changed.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

Jeffrey Spiral Conveyor shown here is handling lime and alum in a large Water Works plant. Note the clamped cover used when dusty material is encountered . . . also the various rack and pinion valves in trough bottom for delivery of material when and where needed. A spiral flight is shown also.

THE SPIRAL CONVEYOR IS A COMPACT UNIT

You can save time and money by using a Jeffrey Spiral Conveyor. A neat and compact installation — no return strand. Capacities vary with size of conveyor. Handles many kinds of material at low cost.

Sectional, Flight, Helicoid, Mixer, Cut Flight, Ribbon and Cast Iron . . . six types manufactured by modern methods with equipment especially designed for the purpose. Uniform strength, perfect fit and true alignment assured.

Jeffrey Spirals are interchangeable with other standard makes . . . are built to industrial standards. Try one on your next handling job whether it's coal, raw sugar, grain, salt cake, cement, carbon black, grape fruit or orange rinds, etc.

Catalog No. 803 fully describes and pictures Jeffrey Spiral Conveyors. Send for it today.

THE JEFFREY MANUFACTURING COMPANY Established 1877

917 North Fourth St., Columbus 16, Ohio

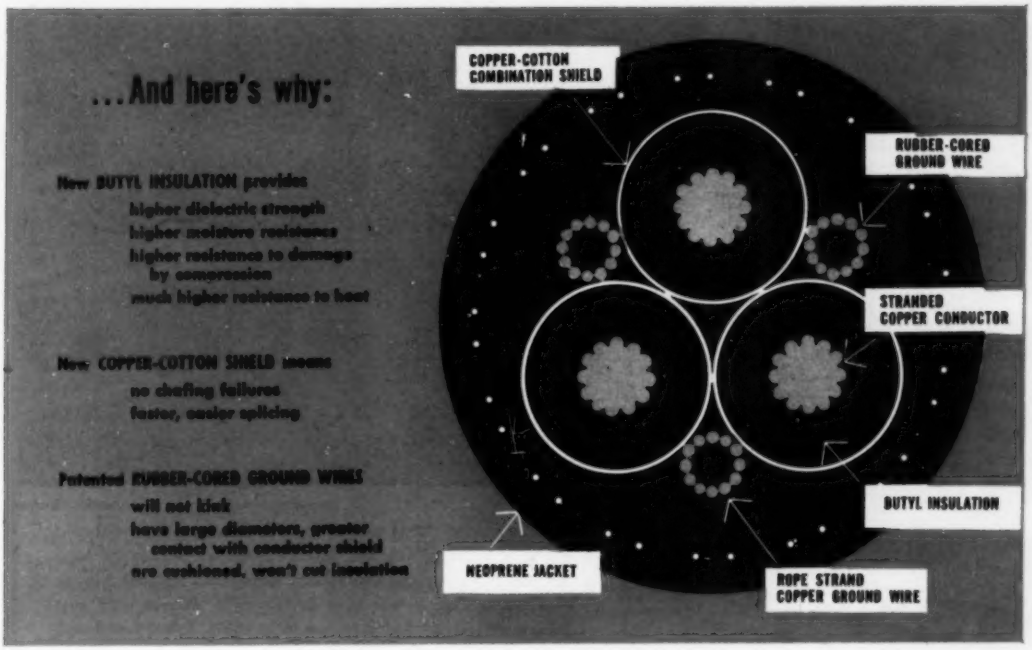
Complete Line of Material Handling, Processing and Mining Equipment

JM

Baltimore 2	Chicago 1	Detroit 13	Jacksonville 2	Pittsburgh 22
Birmingham 3	Cincinnati 2	Harlan	Milwaukee 2	St. Louis 1
Boston 16	Cleveland 13	Houston 2	New York 7	Salt Lake City 1
Buffalo 2	Denver 2	Huntington 19	Philadelphia 3	Scranton 3

Jeffrey Mfg. Co., Ltd., Head Office & Works: Montreal

Now BUTYL makes Securityflex High Voltage Shovel Cable better than ever



Idleness of big shovels through cable failure means big losses. Anaconda's new BUTYL-insulated SECURITYFLEX* Type SH-D High-Voltage Shovel Cable means big savings. For more information get in touch with your nearest Anaconda Sales Office or Anaconda Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

The right cable for the job ANACONDA® WIRE AND CABLE

*Reg. U. S. Pat. Off.

High Power, High Speed, High Efficiency combined in LINK-BELT SILENT CHAIN DRIVES

RUGGED

Link-Belt Silverstreak silent chain drives combine ability to carry heavy overloads with the resilience that sustains and absorbs shock.

DEPENDABLE

Silverstreak silent chain drives cost practically nothing for upkeep—run 10, 20, or more years without attention beyond occasional oiling.

COMPACT

Operating efficiently on short centers, they save valuable space. Ratios as high as 10 to 1 are commonly used.

EFFICIENT

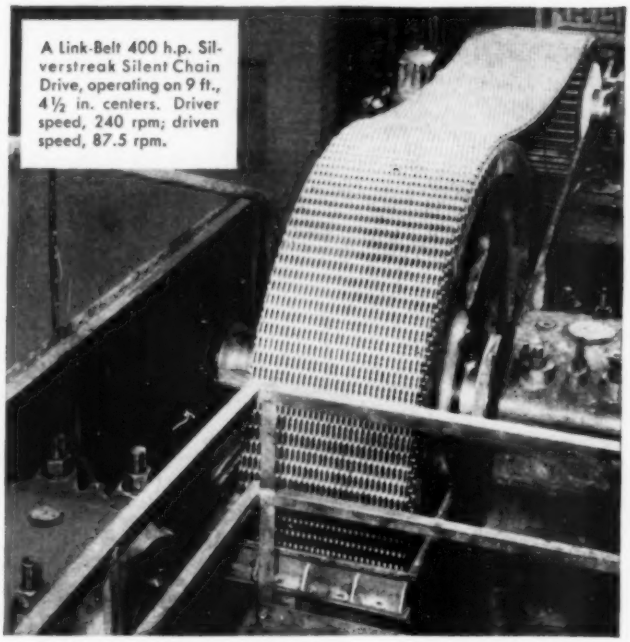
98.2% efficiency maintained throughout the life of the drive.

POSITIVE

As the chain, in the form of a flexible rack, meshes with the teeth of the sprocket, the drive cannot slip.

PRE-SELECTED STOCK DRIVES

Chains and sprockets for drives from ⅓ to 50 h.p. are available from stock at Link-Belt distributors and factory branch stores in all principal cities.



A Link-Belt 400 h.p. Silverstreak Silent Chain Drive, operating on 9 ft., 4½ in. centers. Driver speed, 240 rpm; driven speed, 87.5 rpm.

Link-Belt Silverstreak silent chain is the most efficient and durable medium for the transmission of power at high speeds. Entirely constructed of steel, and enclosed in an oil-tight casing, it will give dependable service with sustained efficiency for long periods. Link-Belt Silverstreak silent chain drives are outstanding where efficiency, wide adaptability and low over-all costs are important. Tested by years of service, they are the most modern type you can use.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices, Factory Branch Stores and Distributors in Principal Cities. 12.044

LINK-BELT Silverstreak SILENT CHAIN DRIVES

For the RIGHT Features* specify Ford INDUSTRIAL ENGINE

Ford "254" POWER UNIT
6 cylinder, 254 cu. in. displacement
(also available as engine assembly alone)

When it comes to industrial engines and power units, one of the most important factors in building and keeping satisfied customers for your equipment is to use—

MODERN POWER . . . with the RIGHT FEATURES

● For example—autothermic pistons with chrome top compression ring . . . high lift camshaft . . . counterbalanced crankshaft . . . heavy duty, precision type, replaceable, steel backed, copper lead main and connecting rod bearings . . . hard face cobalt exhaust valves . . . valve rotators . . . moly-chrome alloy valve seat inserts. That's Ford Power . . . the industrial engine-power unit line that is made throughout to Ford's famed high standards of progressive engineering and quality design.

Bring your power problem to your Ford Dealer, to the Ford District Sales Office nearest you or the Ford Industrial Engine Department at Dearborn, Michigan. There's a Ford Industrial Engine that's *right* for your job.

***Don't forget, too,** the *right* power . . . five great engines in the Ford Industrial Engine line; the *right* service . . . as near as your nearest Ford Dealer . . . as well as the *right* features—all 3 big reasons why equipment builders know Ford Industrial Engines can add important user acceptance to their applications.

Ford Industrial Engines are offered as complete power units, either open or closed, or as individual engine assemblies, both with a wide variety of special attachments. They are made in the following types and sizes:

120 cu. in. 4 cyl. • 239 cu. in. V-8
226 cu. in. 6 cyl. • 254 cu. in. 6 cyl.
337 cu. in. V-8

For full details, MAIL THIS . . .

INDUSTRIAL ENGINE DEPT., FORD MOTOR COMPANY, DEARBORN, MICHIGAN

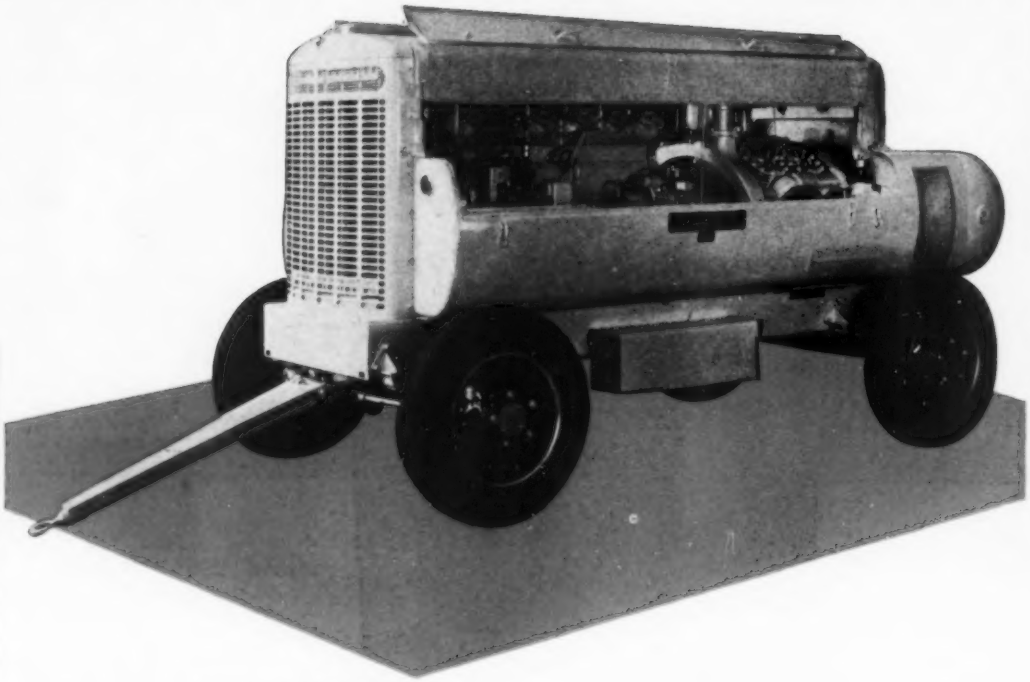
Send me complete details on your Industrial Engines and Power Units.

Name _____

Street _____

City _____ *State* _____

Industrial Engine Department
FORD MOTOR COMPANY
Dearborn, Michigan



THE JOY SUPER-PORTABLE COMPRESSOR

Really portable—smaller than other units of like capacity—produces 630 CFM of air power—runs two 4" wagon drills simultaneously at top efficiency

The
JOY PORTABLE 630
delivers the air—dependably—with low up-keep
• WRITE FOR BULLETIN •

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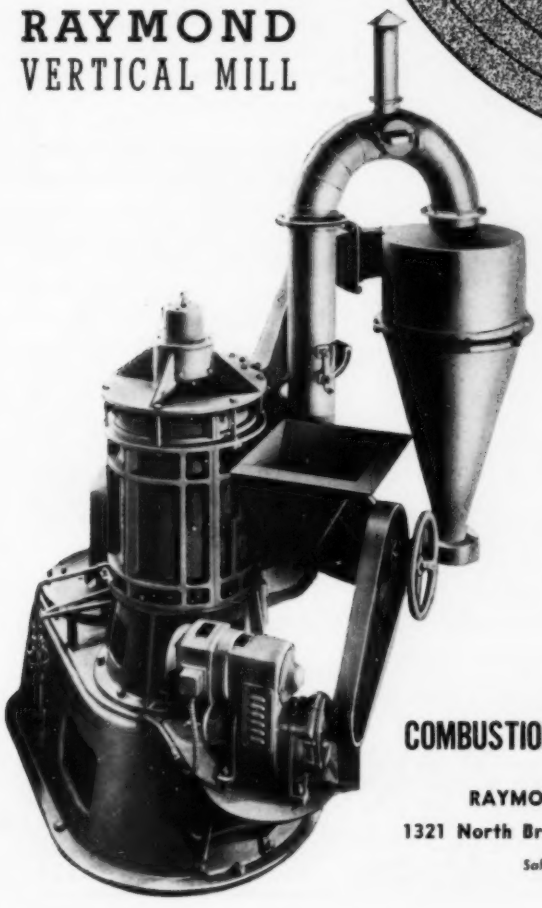
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Broaden Your Product's Market—

by SUPERFINE GRINDING

...with the
RAYMOND
VERTICAL MILL



The Vertical Mill is a specialized unit in the Raymond line of fine grinding equipment, designed for producing extremely fine materials in the lower micron range. It is particularly intended for handling soft nonmetallics and producing finished materials 99% finer than 10 to 15 microns in some cases.

The Vertical Mill brings to many products definitely improved qualities such as finer and smoother texture, better blending and processing properties, as well as very close control of particle size. This unit will enable you to make a premium product that will meet higher specifications and reach wider markets.

For pulverizing talc, clays, graphite, expanded vermiculite, earth colors, and similar soft materials, the Vertical Mill offers important advantages. Write for details and describe your problem.

COMBUSTION ENGINEERING - SUPERHEATER, INC.

RAYMOND PULVERIZER DIVISION
1321 North Branch Street, Chicago 22, Illinois
Sales Offices in Principal Cities

SINCE 1887

J. P. CALLAGHAN CO. Ready-Mixed Concrete Plant

Meets High-Capacity Schedules with 3 LINK-BELT SPEEDERS

Delivering ready-mixed concrete promptly to 450 customers means high-capacity schedules for J. P. Callaghan Company, in Harrison, New Jersey. And those high-capacity schedules depend on machines that bring plenty of power to the job—and can be depended on to stay on the job. That's why the Callaghan Company uses Link-Belt Speeders.

Two K-365's and one K-360 move 3,000 yards of sand and gravel a day from barges and storage piles to two batch houses and a truck-loading hopper. In continuous use for 1, 5 and 7 years, these machines have never been out of service because of breakdowns.

It's this kind of on-the-job performance that has made every Link-Belt Speeder a sure sign of an efficient operation. Every machine in the line is power-packed for high capacity, and precision-built for minimum maintenance. Find out today how Link-Belt Speeder can increase your own materials handling efficiency—see your nearby distributor.

Be sure to see the

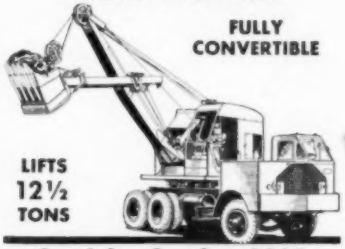
NEW HC-51

TRUCK-MOUNTED HALF-YARD SHOVEL-CRANE

WITH

SPEED-o-MATIC

HYDRAULIC CONTROLS



FULLY CONVERTIBLE

LIFTS 12½ TONS

Send for Catalog 2322

LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION
CEDAR RAPIDS IOWA

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

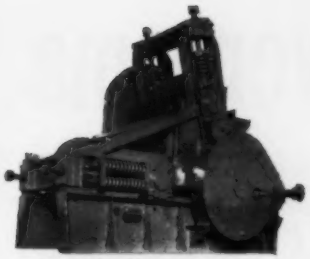
One ax handle wide... 65 miles a day...

THAT'S THE WIDTH ... and the speed ... of a 54" x 24" roll crusher. It can turn out a ribbon of pay material 24" wide ... 65 miles long every day.

Each rock is *grabbed* by the rolls and is force fed in a continuous crushing action. No eccentric ... no intermittent crushing ... no gravity feed ... and the material is cracked, not pulverized.

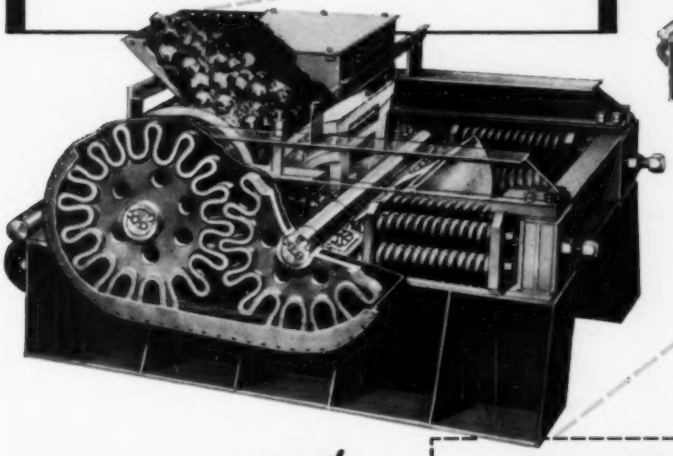
Of course Pioneer makes roll crushers. We're roll crusher specialists! We build twin rolls in four sizes ... we build them for stationary plants and we build them on wheels ... we are the only manufacturers of Triple Roll Crushers. As specialists, we originated "Star Gear" drive for roll crushers, we have cheek plates that make shells wear uniformly from end to end. And we know how to keep shells from banging together ... and cracking.

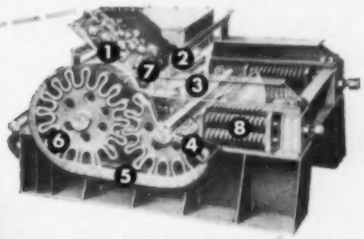
If you want more specification material at lower cost per ton, mail the coupon today.



TRIPLE ROLL CRUSHERS for increased stage of reduction, made in three sizes; 54" x 24", 40" x 22" and 30" x 18". Third roll attachment available for Pioneer Twin Roll Crushers.

COMPLETE SECONDARY UNITS for stationary plants. Pioneer builds Roll Crushers on skids, with motor or power unit and drives. Simplifies installation ... assures satisfactory operation from the start.





1. **Hopper Spreads** material over full width of roll.
2. **Cast Manganese Steel Shells** held in place by full circle wedges.
3. **Shells Changed** without removing bearing from shaft.
4. **Timken Roller Bearings** in self-aligning pillow blocks.
5. **Oil Tight,** dust tight gear housings.
6. **Star Gear Drive** eliminates chains.
7. **Wedge Blocks** provide easy adjustment.
8. **Safety Spring Release** protects crusher.

BUY BOTH!

Higher Output, Lower Upkeep!

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● Please send information on the Roll Crushers checked:

- ☐ 24 X 16 ROLL CRUSHER
- ☐ 30 X 18 ROLL CRUSHER
- ☐ 40 X 22 ROLL CRUSHER
- ☐ 54 X 24 ROLL CRUSHER
- ☐ TRIPLE ROLL CRUSHER
- ☐ ROLL CRUSHERS ON WHEELS

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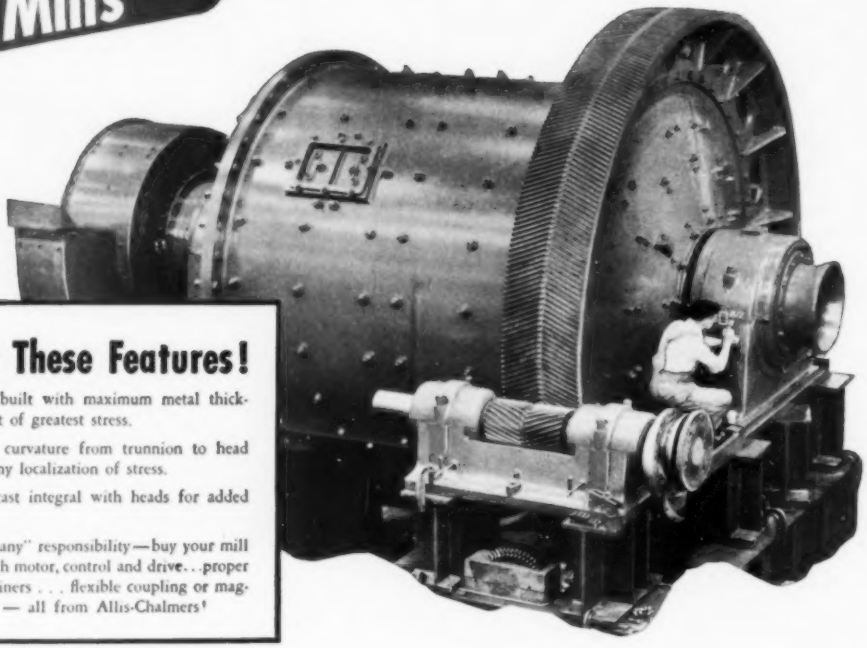
Overcome Problem of High Starting Torque

ALLIS-CHALMERS **Grinding Mills**



Check These Features!

- Trunnions built with maximum metal thickness at point of greatest stress.
- A gradual curvature from trunnion to head eliminates any localization of stress.
- Trunnion cast integral with heads for added strength.
- "One company" responsibility—buy your mill complete with motor, control and drive...proper feeder and liners . . . flexible coupling or magnetic clutch — all from Allis-Chalmers!

TRUNNION BEARINGS on all the larger sizes of Allis-Chalmers grinding mills are supplied with an individual high pressure lubricating pump to provide lubricant between mill trunnion and bearing during initial starting, insuring minimum starting torque and bearing wear.

Hand operated bearing lubricating pump.

Floating the mill in this way results in much less punishment to vital parts. Reduced starting torque gives you less strain on gear teeth and less torsional strain on the pinionshaft.

REDUCES DOWNTIME

Protection from excessive wear and strain in starting your mill will prove to be immensely important in terms of less costly maintenance and less idle mill time. Another reason it pays to specify A-C mills!

Allis-Chalmers builds a complete line of grinding mills: ball and rod mills; pebble mills, Compeb and Ballpeb mills. The A-C representative in your area can be a big help in working out grinding problems. Call him today, or write: A-3044

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IF you're still in the dark about ***NEW***

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CHECK THESE FACTS:—

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But get *all* the facts—see your nearest International Truck Dealer or Branch, *soon*.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors... Motor Trucks Industrial Power... Refrigerators and Freezers

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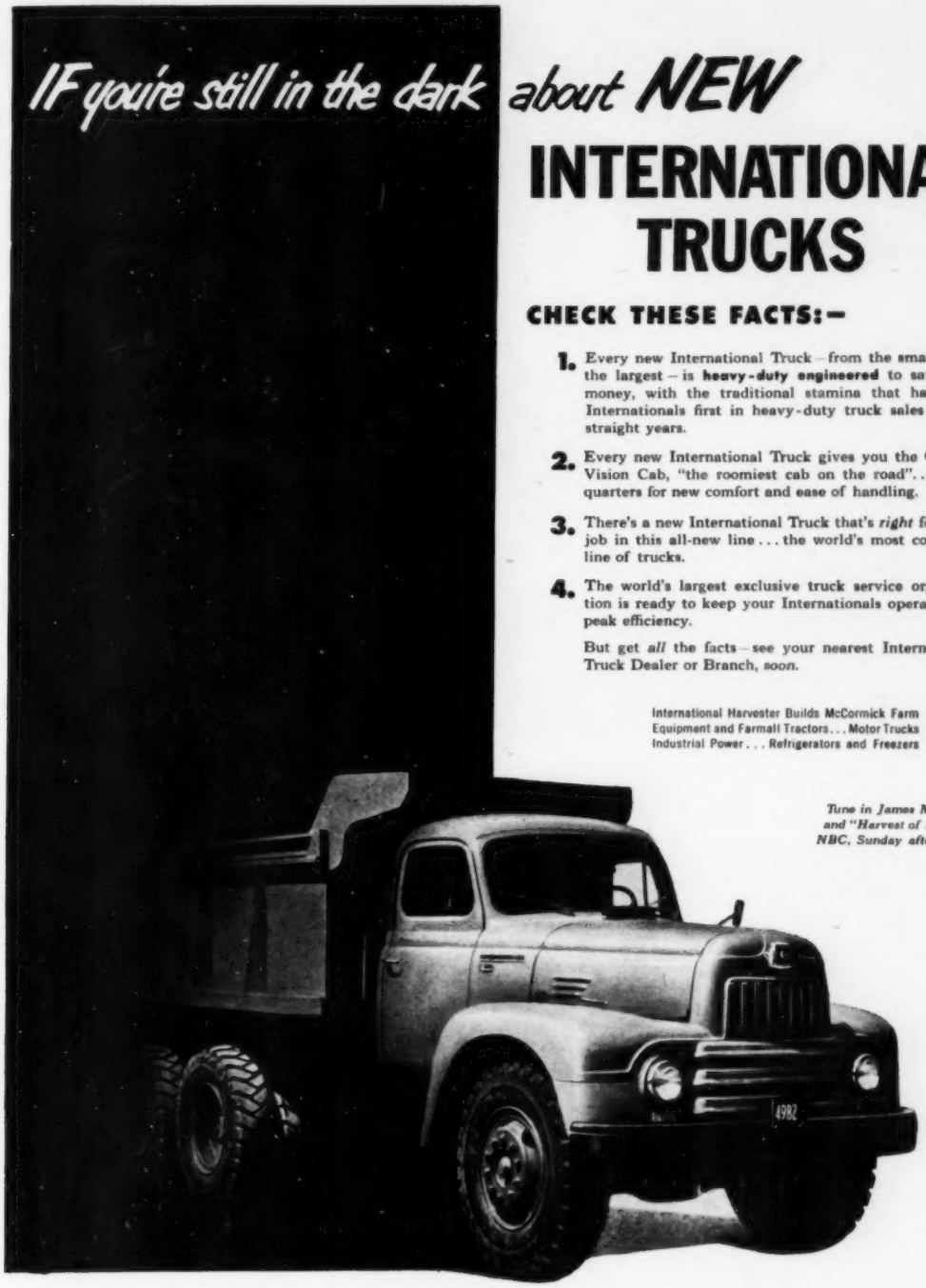
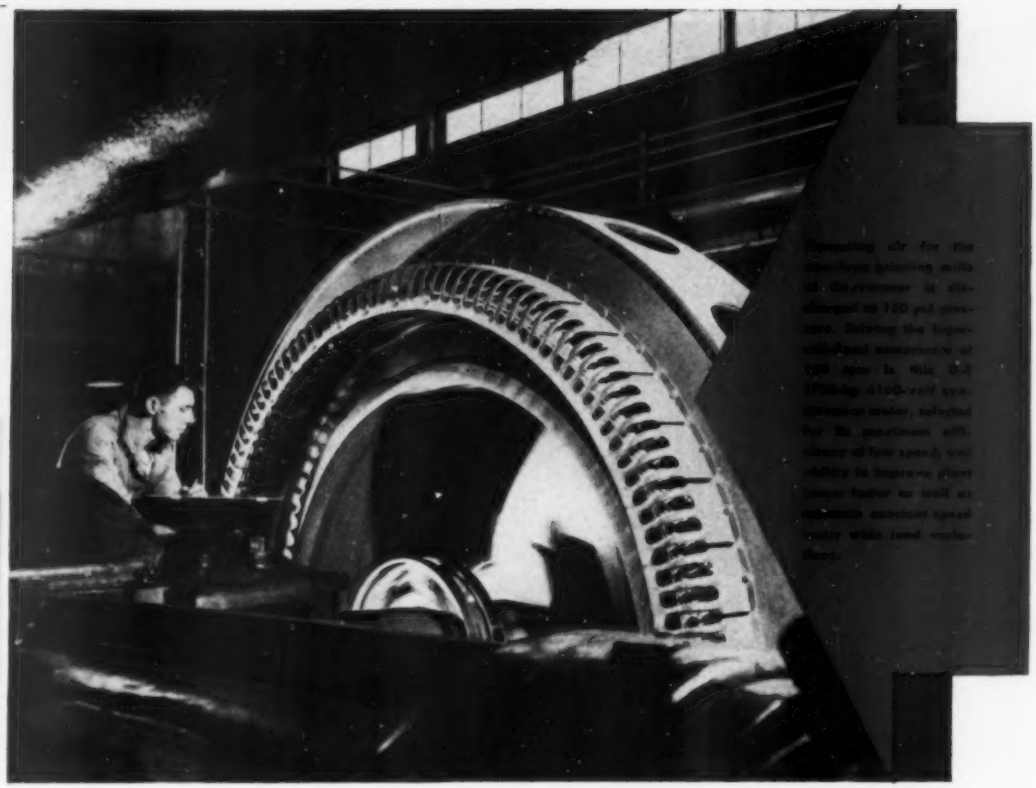
Tune in James Melton and "Harvest of Stars" NBC, Sunday afternoons



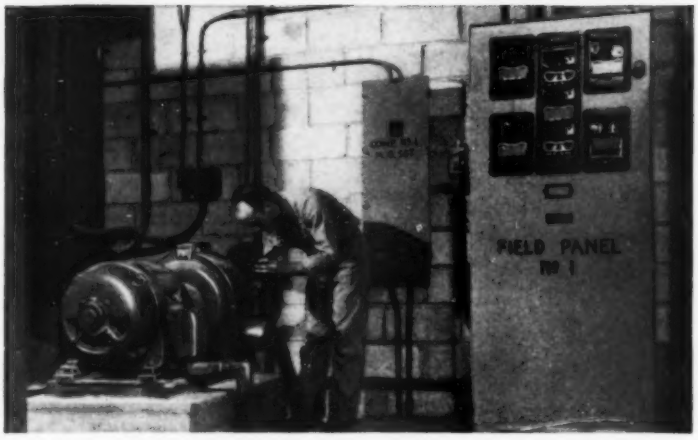
ALL NEW, ALL PROVED

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY CHICAGO



Field excitation from the synchronous motor is provided by the G-E motor-generator set at left, comprising a 30-hp Tri-Clad motor and a 20-kw 125-volt generator. The compact, metal enclosed cubicle at right contains control equipment that provides the desired field current for the proper excitation of the G-E synchronous motor.



You can put your confidence in—

GENERAL ELECTRIC

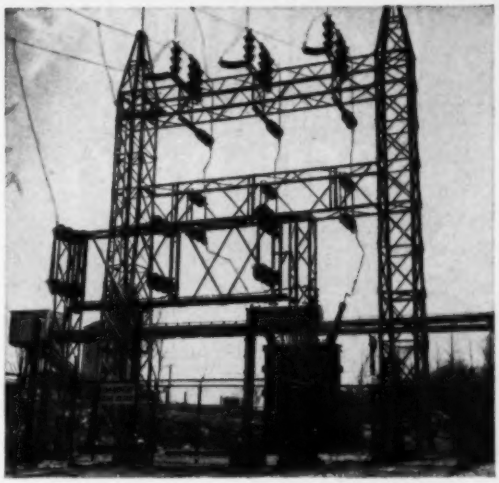
658-1

G-E SYSTEM POWERS NEW GRINDING PROCESS FOR TOP OUTPUT!

Co-ordinated G-E equipment helps maintain 200-ton-per-day output of super-fine talc

Down to 1/30,000th of an inch! That's how fine the talc is pulverized at the Gouverneur Talc Co. plant in upper New York State, a subsidiary of the R. T. Vanderbilt Company of New York City. Here is a new process using hot compressed air to literally blast particles against each other at terrific velocity. Here, too, is another electrical system furnished and co-ordinated by General Electric to provide top power-supply reliability.

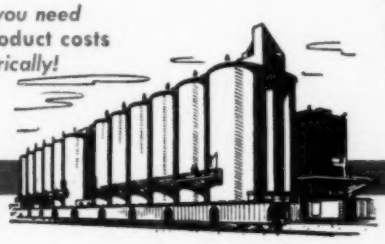
In planning a new or modernized plant, discuss *your* electrical needs early with a G-E engineer. His advice can help speed production, cut costs. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



Gouverneur's G-E outdoor unit substation, rated 3750 kva, 85 kv, steps down incoming high-voltage power to 4160 volts for plant distribution. Further reducing voltage to 480 volts at load areas are 3 G-E 500-kva load-center unit substations.

G-E metal-clad switchgear, as in this assembly at Gouverneur, includes incoming-line and feeder breakers selected to assure adequate interrupting capacity. Units, shipped assembled for easy installation, are metal-enclosed to protect personnel.

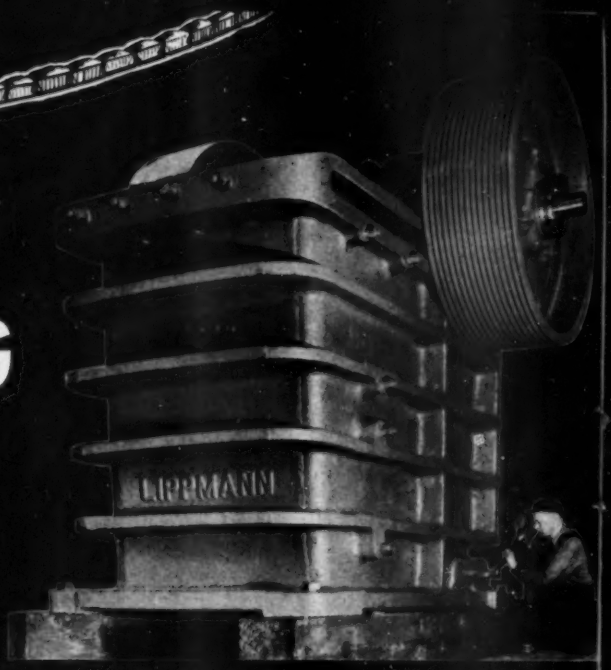
Everything you need
to cut rock product costs
. . . electrically!



Another Example of **Why Leading Contractors Prefer Lippmann Equipment**

Crushes

A MILE-LONG TRAINLOAD OF HARD LAVA ROCK PER DAY!



36 x 48 GRIZZLY KING was fed by two 2-yard shovels, reduced hard lava rock to minus 6 in. at 360 tons per hour. Lippmann Jaw Crushers have extremely low power consumption, have never had a shaft or bearing failure with proper maintenance.

Lippmann 36x48 GRIZZLY KING, World's Largest Overhead Eccentric Jaw Crusher, Hits Amazing Peak of 5700 Tons per Day for Big Colorado Quarry.

On large jobs or small, more and more experienced operators are using Lippmann equipment. Take the case of the big Colorado quarry that was awarded a huge contract to make aggregate from lava rock so hard that ordinary steel drill bits would not do the work and carbide tips had to be used.

This contractor, despite a slow start because of bad weather, wound up his first season comfortably ahead of schedule. To do this, he operated his 36x48 Lippmann GRIZZLY KING Jaw Crusher two eight-hour shifts . . . hit a peak of 360 tons per hour . . . *5700 tons per day!*

Blast-run rock was fed on a Lippmann Super-Duty Feeder to the crusher. GRIZZLY KING'S extra-long jaws, engineered crushing action, complete oil lubrication and alloy steel construction provided the tremendous capacity required at extremely low maintenance costs. (Actually only a few bolts were replaced during the entire seven month season; no die replacements, even with this highly abrasive rock.)

Other high-capacity, low-maintenance Lippmann-engineered equipment on this huge job includes five Screen-All Vibrating Screens with sharper sizing action . . . 12 Lippmann Belt Conveyors whose Life-Sealed Ball Bearing Idlers never require added lubrication . . . six sturdy Lippmann bins.

You, too, can profit by the experience of the country's leading contractors who choose Lippmann over all other makes. Lippmann engineering means higher capacity at lower cost . . . more efficient operation with less maintenance.

OTHER 36x48s PROVE REAL MONEY MAKERS

- Replacing a competitive unit, GRIZZLY KING balanced designed allowed an Indiana quarry to double its output with the rest of the equipment unchanged. Increased production will pay the entire crusher cost in two years.
- On a hard limestone job in Tennessee, balanced design of GRIZZLY KING has crushed 2,500,000 tons in two years without a single jaw die replacement.
- In a Canadian hard limestone quarry, GRIZZLY KING 36 x 48 produced half a million tons of minus 3½ in. stone in first six months' operation. Balanced design kept jaw dies "looking like new."

NOTE ABSENCE OF CATWALKS on these Lippmann Belt Conveyors in the Colorado quarry. That's because Life-Sealed Ball Bearing Idlers need no added lubrication or periodic alignment, a tremendous grease and labor saving.

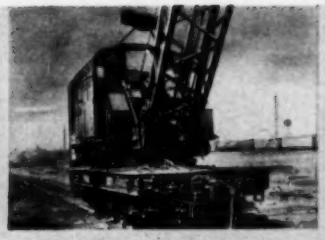
LEW

FOR ALL THE FACTS on the complete Lippmann line for pits, mines and quarries write for: Grizzly King Jaw Crushers (Bulletin 1100), Screen-All Vibrating Screens (1200), Pulverizers (1160), Belt Conveyors (1400), Gyra-Gaema Secondary Crushers, Circuit Rider Self-Propelled Crushing Plants, Portable Washing Plants, Apron Feeders (1450).

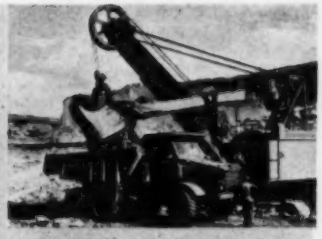
LIPPMANN ENGINEERING WORKS

4603 West Mitchell St., Milwaukee 14, Wisconsin

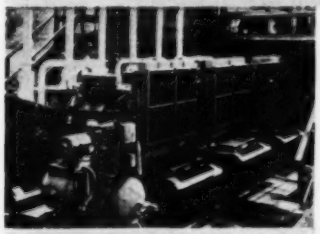
LOCOMOTIVES—Repowered with GM Diesel Torque Converter unit, this 20-ton locomotive hauls double the tonnage without ever shifting into low gear.



HOISTING—Converted from steam to GM Diesel Torque Converter power—estimated operating savings will pay repowering and overhaul cost in less than two years.



EARTH MOVING—Two 190 H. P. GM Diesel Torque Converter units give 34-ton Euclid 1-PPD rear dump a speed of 25.4 m.p.h. with full load.



DRILLING—"½ faster than with original engines," says owner of rig repowered with 3 GM "Twin" Diesel Torque Converter units.

LOGGING—Powered with GM Diesel Torque Converter unit, this Washington Iron Works yarder has yarded 140,000 bd. ft. per day.

WRITE FOR YOUR COPY

of 24-page illustrated catalog giving full details on design, operation and application of "The NEW General Motors Diesel Engine-Torque Converter Unit."

How to Get MORE WORK from your Equipment

Operators in every field report they get more work done in less time at lower cost with equipment powered by General Motors Diesel Engine-Torque Converter units.

The combination of a GM Diesel engine with an integrally built torque converter and fluid coupling provides a compact power unit which makes available maximum engine horsepower and torque regardless of the speed of the load. It delivers high torque for starting heavy loads and *automatically* shifts to fluid coupling when load requirements equal engine torque. Gear shifting is cut to a minimum —often eliminated. Smooth transmission of power through a fluid, protects both engine and driven machinery from sudden shock loads—prevents engine stalling under any load condition.

These efficient Diesel Engine-Torque converter units are available with 3-, 4-, and 6-cylinder engines, Twin 4 and Twin 6 multiple engines, rated at 64 to 294 B.H.P. See your GM Diesel distributor or write us for further information.

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SINGLE ENGINES . . . *Up to 275 H. P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS . . . *Up to 800 H. P.*

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Vol. 43 AUGUST 1950 No. 2

PIT AND QUARRY

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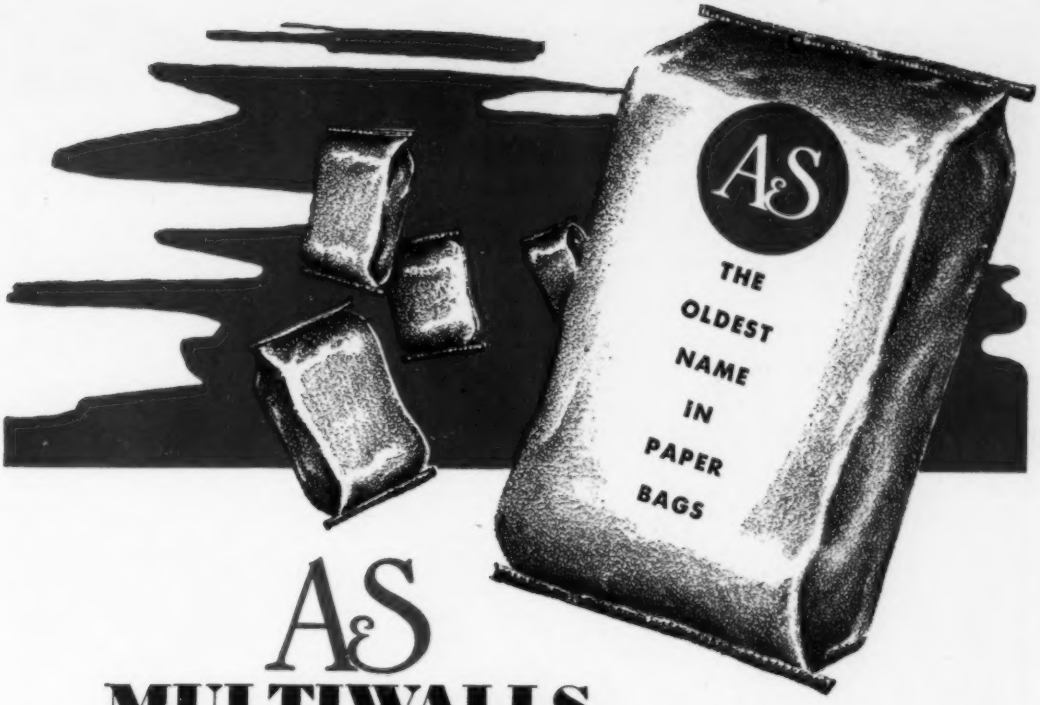

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RECENT DEVELOPMENTS FROM THE A&S PACKAGING LABORATORY

- **EXPENDABLE PALLETS** — Palletized shipments of A&S bags lower your handling costs, minimize storage space.
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- **SUPER GLOSS FLOUR BAG** — Toughest of flour bags is bright white with brilliant inks to provide sparkling, appealing shelf packages.
- **ARK-TONE PRINTING** — Sharp, clear color process combines perfect reproduction and brightness for consumer packages.
- **HI-TONE PRINTING** — Strong, deep colors for sugar, salt, rice and similar bags.
- **PRESSUR-PAK BALE** — Bags are packed under pressure. Saves 50% of customers' space allotted to storage.

● A&S Multiwall bags *stand up* under all kinds of shipping and storing abuse, because every ply is made of No. 1 specification kraft, and every bag must pass the rigid A&S spot inspections.

A&S Multiwalls *stand out* because they are printed on modern 4-color presses that reproduce a bag design in eye-arresting colors unsurpassed in commercial bag printing. Why not have our A&S packaging specialists analyze your packages? These men know how to build impact into the flat exterior of what could otherwise be a dull and unimaginative package. This combination of unusual design and faultless printing is yours at no extra cost.

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editorial

Delivered Pricing

PRESIDENT TRUMAN on June 16, 1950 vetoed Senate Bill S.1008—the "Delivered Pricing Bill"—which was intended to redeclare the lawfulness of independent, competitive delivered pricing and to eliminate the uncertainty in industry over the legality of quoting on a delivered price basis and absorbing freight to meet bona fide competition. This veto insures for an indefinite period a continuation of the confusion which has existed in affected heavy goods industries since the Supreme Court's decision on the matter went into effect on July 9, 1948. The President's action came as a surprise as the bill had passed Congress after two years of stormy discussion which must have brought out all its merits and demerits. The bill had been approved by officials of the Department of Justice, by the President's Council of Economic Advisers, and was twice passed by both houses of Congress with substantial majorities.

In a statement made by Senator Joseph C. O'Mahoney of Wyoming, principal sponsor of Bill S.1008, attention is directed to two passages from the veto message which he regards as significant. After stating that this legislation was not necessary and would lead to more confusion, the President asserted: "Thus it is quite clear that there is no bar to freight absorption or delivered prices as such." Senator O'Mahoney regards this as an expression of the desire of the President that the Federal Trade Commission should not bring any proceedings against any seller who, by *individual* action, without combination or conspiracy, adopts either of these practices.

Senator O'Mahoney also finds encouragement in another statement from the veto message. We quote: "I recognize that businessmen have been concerned lest they be penalized for perfectly sensible and appropriate competitive action. I believe their concern is unwarranted." The senator interprets this and other statements in the veto message to indicate that the President is in sympathy with the aims of the Bill. Again quoting the Senator: "Therefore, I draw the inference from the President's message that sellers who reduce prices for competitive purposes without any prima facie proof of an existing danger of substantially lessening competition or tending to create a monopoly are not jeopardized under the President's interpretation of existing law . . . in my opinion, they need not fear adverse action by government agencies, when, by individual action, they engage in competitive production, distribution and sale of the commodities in which they deal."

Another encouraging development was the appointment by Senator Johnson of Colorado, Chairman of the Senate Commerce Committee, of a special "watch-dog" subcommittee to study the manner in which the Federal Trade Commission handles freight absorption and delivered pricing problems.

In an informative executive letter on June 27 to the membership of the National Sand and Gravel Assn. the National Industrial Sand Assn. and the National Ready Mixed Concrete Assn., Vincent P. Ahearn, executive secretary of these three bodies, stated "It is unlikely, however, that the next Congress will make any serious effort to pass a bill like S.1008, unless the watch-dog subcommittee, on the basis of subsequent developments in the Federal Trade Commission or in the courts, strongly recommends another effort to write a bill which the President will sign."

The Marquette Cement Manufacturing Co., which has become the champion of independent, competitive delivered pricing, announced to its customers on June 30 that it would continue to sell on that basis, as it has uninterruptedly in the past.

This announcement stated that "Purchases of cement and of all heavy goods, when sold on a true competitive basis, have always been firmly based on the lowest total cost at the customer's point of use. A long standing policy of ours and of the law is that no customer shall be the victim of discrimination. By lowering our price to meet a lower price of a competitor in a particular market, our customer in that market is assured that he has no cost disadvantage to overcome in his competitive efforts. Thus, our policies tend to benefit the ultimate consumer."

Wartime Economic Controls

THERE is a growing conviction in economic and industrial circles that we will soon have imposed upon us controls similar to those of World War II. It is felt that, even if we do not have an all-out war with Russia, there will be a series of clashes similar to the present one in Korea. If we step up our military strength sufficiently to win these "wars" it is thought that a full-scale conflict might be postponed indefinitely. If we lose any of them, however, or do not make it clear that we are determined to uphold the aims of the United Nations it is believed that Russia may eventually be encouraged to make a supreme effort to dominate the world.

The preparations we must make to meet any future developments may include industrial as well as military mobilization with a series of controls similar to those of the last war. These would probably include allocations, wage and price controls, rationing, etc., and civilian needs would be subordinated to those of the military. There would probably first be a curtailment of the amount of steel allotted for normal uses, and controls would later be put on the use of aluminum, copper, zinc, lead, etc., and on some of the non-metallic minerals. Civilian construction would also be limited and the output of cement, aggregates, etc., would be diverted largely to war needs.

Producers of non-metallic minerals are advised to assume that controls may be imposed on industry this year. Plants should be put in the best possible condition and there should be a reasonably adequate inventory of spare parts and supplies. Producers should not let themselves be caught as they were before World War II when many plants were so run down that it was impossible to produce efficiently to meet all-out war needs. The individual company should also develop a price policy in anticipation of controls and the present status of employees should be reviewed with respect to the Selective Service Act of 1948.

Walter E. Trauffer

GRINDING MILLS

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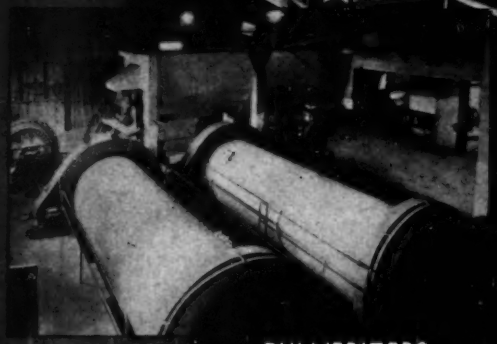

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ATOX MILLS

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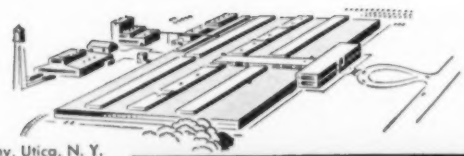
Its design incorporates all the factors that make for fast, efficient, economical operation.

Low maintenance is assured by such features as a replaceable bronze chuck rotation nut to protect piston splines from scoring and a replaceable bronze cylinder bushing liner to make it easy to maintain piston alignment and full cushioning.

The CP-59 is equipped with a 4-in-1 backhead. Rapid and inexpensive changeovers make possible plain dry, blower dry, plain wet or air-wet operation.

Have your nearest CP dealer give you a demonstration of this outstanding drill, or write for a copy of SP-3009.



With its half million square feet of floor space, Chicago Pneumatic's new Utica unit is the world's most modern plant for the production of pneumatic and electric tools.

Chicago Pneumatic Tool Company, Utica, N. Y.

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news of the industry

PIT AND QUARRY

Class A, Class B Winners Posted in Safety Contest Of Slag Companies

According to final tabulation of the safety reports from slag plants participating in the safety contest sponsored by the Bureau of Mines and the National Slag Assn., the following companies have been announced winners:

Class A—Thomas plant of the Birmingham Slag Company, Birmingham, Ala. Class B—Chicago plant of the France Stone Company of Toledo, O.

Plaques will be awarded to the two winning plants by PIT AND QUARRY at the mid-year meeting of the National Slag Association.

N.C.S.A. Division Committee Plans Membership Drive

The membership committee of the Manufacturers' Division of the National Crushed Stone Association met on July 19 at the Palmer House, Chicago. Division Chairman J. Craig McLanahan and Wayne W. King, committee chairman, presided. Steps were taken to initiate a drive for new members in the division.

In attendance were D. M. Blackburn, Hendrick Mfg. Co.; J. B. Bond (substituting for C. O. Friend), Nordberg Mfg. Co.; A. E. Conover, Robins Conveyors Division; E. J. Goes, Koehring Co.; A. Goldberg, Allis-Chalmers Mfg. Co.; Ralph C. Johnson, Simplicity Engineering Co.; Wayne W. King, W. S. Tyler Co.; J. C. McLanahan, McLanahan & Stone Co.; L. C. Mosley, Marion Power Shovel Co.; Walter E. Trauffer, PIT AND QUARRY.

A.I.M.E.'s Industrial Minerals Division Plans Fall Meeting

As announced by Robert C. Stephenson, chairman of the program committee, the fall regional meeting of the Industrial Mineral Division, A.I.M.E., will be held in Norman, Okla., on October 17, 18, 19, and 20. The Oklahoma Geological Survey will be host of the meeting. Dr. Robert H. Dott, director of the Survey, is chairman of the local committee.

According to present plans, October 17 and 18 will be devoted to a program of technical papers. A two-day field trip in the Arbuckle Mountain area will be led by W. E. Ham of the Oklahoma Geological Survey on October 19 and 20. In the course of the trip the members will visit active glass sand, dolomite, limestone, asphalt, and cement operations, as well as other industrial mineral deposits and points of geologic interest.

On October 17 Dr. Hugh D. Miser, staff geologist, U. S. Geological Survey, will speak at a dinner meeting. The meeting at Norman will be the first A.I.M.E. session to be held in this area.

Completion of work on the McGrath Sand and Gravel Company's new loading dock in Chillicothe, Ill., will enable the firm to make river shipments of its products over the inland waterways system. A channel 11 ft. below the normal river pool depth was cut to insure adequate draft for vessels in all seasons.

Coming Events

October 11-12, 1950 — Colorado Springs. Fall meeting, National Industrial Sand Association, The Broadmoor.

October 16-20, 1950 — Chicago. 38th National Safety Congress and Exposition, Stevens, Congress, Morrison, and LaSalle hotels.

October 17-20, 1950 — Norman, Okla. Fall regional meeting, Industrial Minerals Division, American Institute of Mining and Metallurgical Engineers.

February 5 (week of), 1951—Cincinnati. 34th annual convention, National Crushed Stone Association and 6th annual convention, Agricultural Limestone Institute. Netherland Plaza Hotel.

February 11-15, 1951—New Orleans. 35th annual convention, National Sand and Gravel Association and 21st annual convention, National Ready Mixed Concrete Association, Roosevelt Hotel.

Basic Refractories Workers Publish Pledge of Loyalty To U.S.A. in Press Ad

The following full-page advertisement appeared on July 3 above the signatures of the 410 employees in the Ohio plants of Basic Refractories, Inc., in *The Advertiser Tribune* of Tiffin, O., *The News Messenger, Fremont, O.*, and *The Green Springs Echo*, Green Springs, O.:

Our Belief: in the divinity of God, the dignity of man and the destiny of our country.

Our Belief: that "man shall live by the sweat of his brow."

Our Belief: in a "fair day's work for a fair day's pay."

Our Belief: that a man should live within his income and pay his honest debts, and that our government should operate on the same sensible basis.

Our Belief: that under the American Way of Life we already HAVE a higher standard of living than any other governmental system has ever offered—let alone delivered!

Our Belief: that as free men, proud of our achievements and jealous of our rights, there is no place in our midst for communists, fellow travelers and other cranks who by wild accusations and empty promises would lead is down the trail to political and economic slavery.

Our Belief: that it is our duty as free men to speak out in defense of our American Way of Life and to go on record to that end.

So We Proclaim with the firm conviction that 99 percent of all Americans subscribe to the above sentiments, that we—the undersigned employees of Basic Refractories, Inc.—herewith and henceforth endorse and pledge our wholehearted support to the same. May God be with us.

The advertisement was reported to have been a spontaneous project on the part of the employees.

Campo Milling Corporation, newly organized, recently purchased the feldspar mill and quarry at Campo in San Diego County (California) from the American Radiator and Standard Sanitary Company.

June Building Volume Passes $1-Billion Mark—Half-Year Total a Record

Engineering construction contracts in June totaling $1,253,720,000 set a new record for any month in history—peace or war. Housing projects, highways and bridges all hit new highs in June as reported by *Engineering News-Record*.

This highest crest yet in volume closes out the greatest first half in construction history. The January-June total of $5,665,066,000 in engineering construction contracts is 44 percent over 1949, 70 percent over 1948 and 15 percent over 1942, the previous record first half.

June was the biggest month ever for private construction at $728,064,000, and the biggest preacetime month for public works contracts, $525,656,000.

Even more private housing projects were contracted in June than in earlier record months of this year. The $464,008,000 June volume is 35 percent over the previous housing record, set this April.

Highway contracts also hit a new high at $153,331,000—33 percent over the record totals of $115,000,000 in July of both 1949 and 1948. And, going along with highways, bridge contracts valued at $51,309,000 set a new record—21 percent over September, the previous high month.

Here is how the record first half of 1950 compares with last year:

Private contracts totaling $3,234,378,000 are 71 percent ahead of last year's January-June figure. Public works, $2,430,688,000, up 19 percent. Federal contracts totaling $715,813,000 are 29 percent over last year; state and municipal contracts at $1,714,875,000 are up 15 percent.

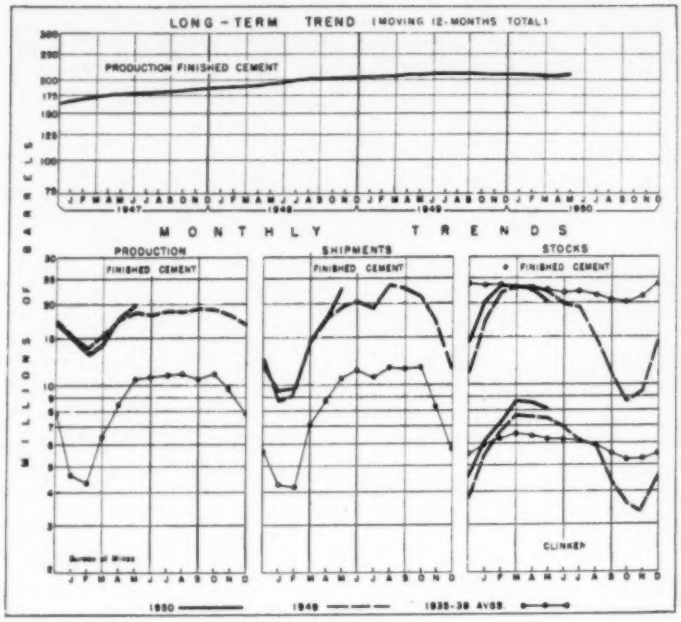
Biggest boon to 1950 construction is housing. Large-scale housing projects contracts are more than double last year (up 114 percent). This is a main driving force, sending waterworks and commercial building also to new highs and keeping sewerage contracts at last year's record rate.

Other types of construction going higher than ever before are streets and roads, bridges, industrial buildings, and private nonbuilding construction (unclassified) such as pipelines and transmission lines.

Contract award tallies for the first half of 1950, as compared with a year ago, are as follows:

Public works—waterworks $118,467,000, up 36 percent; sewerage $128,006,000, down 1 percent; bridges $188,201,000, up 11 percent; earthwork and waterways $236,282,000, down 23 percent; streets and roads $617,746,000, up 52 percent; public housing $118,110,000, down 41 percent; other public buildings $828,334,000, up 37 percent; and unclassified construction $195,542,000, up 39 percent.

Private contracts—industrial buildings $579,187,000, up 15 percent; housing projects $1,906,798,000, up 114 percent; commercial buildings $461,560,000, up 59 percent; unclassified construction $282,853,000, up 38 percent; and private bridges $3,980,000, up 29 percent.



SUMMARY—The output of 19,950,000 barrels of portland cement during May, 1950, as reported to the U. S. Bureau of Mines, increased 7 percent over the production for May, 1949. Mill shipments amounted to 22,834,000 barrels during the month—18 percent over the May, 1949, totals, while stocks of 20,043,000 barrels on May 31 were 10 percent below the May, 1949, figures. Clinker output in May 1950, amounted to 19,650,000 barrels—6 percent over the production reported for the corresponding month of 1949.

PRODUCTION—The production of 19,950,000 barrels of finished cement came from 150 plants located in 36 states and Puerto Rico. In the same month of 1949, 18,622,000 barrels were produced in 146 plants. Clinker production was up 6 percent over the May, 1949, total.

SHIPMENTS—Mill shipments amounted to 22,834,000 barrels and were 18 percent greater than the total reported for May, 1949. The demand for cement, as indicated by mill shipments, increased substantially over that of the previous month (April, 1950) when 18,424,000 barrels (revised), were shipped. Shipments were greater in all but one district. Illinois district shipments declined 2 percent from May, 1949, totals, while the greatest increase (31 percent) was recorded in the Ohio district. Shipments increased 12 percent in the Puerto Rican district.

STOCKS—Stocks of finished cement on May 31 amounted to 20,043,000 barrels—10 percent below the May, 1949, total, while clinker stocks as of the same date totaled 8,086,000 barrels—up 9 percent.

Warner Company Completes Swing Bridge at Van Sciver

According to a recent issue of *Warner News*, official organ of The Warner Company, the swing bridge built by the firm on the Bordentown Ferry Road has been completed, permitting the continuation of traffic on this thoroughfare and enabling the dredge *Valiant* to move from the Van Sciver Basin into new digging ground on the south side of the road.

The bridge building project began soon after the company started an extensive project on its sand and gravel land near the Van Sciver plant. Since the Bordentown Ferry Road is a public road, it was not possible to abandon it or cut through it, leaving no highway for traffic. The swing bridge had to be built, and it was!

Juban Gravel Expands With Operation of Two New Plants

The Juban Gravel Company of Shreveport, La., has purchased the Winn Gravel Company, located 18 miles west of Winnfield, La., on the Saint Maurice Highway, from Claud DeJersey Sr. of Winnfield.

Under its new ownership, additional equipment will be installed in the plant. It was also announced that the Juban Gravel Company will operate another gravel plant near Minden, La. F. J. Van Peene is manager for Juban Gravel.

Recent installations of Cottrell 25-in. "Whirlcone" separators in sand-and-gravel plants include those of Graham Bros., Inc., El Monte, Calif., and the B. V. Hedrick Gravel & Sand Co., Lilesville, N. C. In each instance, the wet cyclones are being used mainly to extract minus 50-mesh sand from classifier overflow, formerly wasted.

Cement Men Fete Medusa President for 52 Years of Service

J. B. John, president of the Medusa Portland Cement Company, was honored on July 11 by the portland cement industry on occasion of his 80th birthday and the completion of 52 years of service in the cement industry.

At a celebration at the Pepper Pike Country Club, Cleveland, O., 77 members of the portland cement industry in the United States and Canada gathered in his honor for luncheon, an afternoon of recreation, and a banquet.

Mr. John's life is a true Horatio Alger story. When he was 10, his father was killed in the anthracite mines of Pennsylvania. At that early age he became a slate picker in the coal mines, rising gradually from this humble beginning to become the head of one of America's largest cement companies.

Mr. John has made notable contributions to the American portland cement industry. He joined the Lehigh Portland Cement Company as a mechanic in 1898. His production genius was early recognized and several cement companies commissioned him to build their cement plants. His ability was so outstanding that at one time he simultaneously held offices of either president or vice-president of three competing cement concerns, the Newago, Manitowoc, and Medusa portland cement companies, together with the Crescent Portland Cement Company, were later merged into the Medusa Portland Cement Company.

Toastmaster at the recent celebration was Walter A. Wecker, president of the Marquette Cement Manufacturing Company. Joseph Brobston, chairman of the board of the Hercules Cement Corporation, presented a silver tray to Mr. John engraved with 103 signatures of officers of various portland cement companies. L. A. Galster, president of the Petosky Portland Cement Company, presented to Mr. John a commemorative book with a silver inlaid plate inscribed with the names of those present.

P. G. Dawson, vice-president and treasurer of Medusa, presented a silver bowl engraved with the following names of the officers of the Medusa Portland Cement Company: Harry L. Berno, executive vice-president and general manager; E. S. Rogers, vice-president and general sales manager; W. J. Worthy, vice-president in charge of operations; Charles C. West, vice-president; R. H. Campbell, vice-president in charge of white cement; and Fredric Pickford, secretary.

Texas Panacalite Announces Plans for New Perlite Plant

S. W. Johnson, president of Texas Panacalite Company, manufacturer of light-weight building, insulating and scouring material from lava, has announced the company's plans for construction of a $100,000 perlite processing plant in Irving, Tex. Raw materials will be shipped in from ancient lava beds in Nevada.

The new plant will be a completely utilized operation with latest-model machines for unloading the lava from railroad cars, for placing it in the furnace, for sacking it in 4-cu. ft. bags and for loading the bags in boxcars and trucks for shipping. Capacity of the plant will be 50,000 bags per month, Mr. Johnson stated.

J. B. John of Medusa

Texas Panacalite Co. operates under a franchise from the Combined Metals Reductions Company, Salt Lake City, Utah. Mr. Johnson was associated with the Utah concern for 11 years as head of the perlite process development work.

Cover Picture....

• The Hawthorne quarry of Samuel Braen's Sons in Passaic County serves the fast growing area covered by Bergen, Passaic and Morris Counties in New Jersey. Started early in the present century, it is now enjoying its most successful period of growth and expansion. Operations are under direct management of Samuel Braen, president and principal stockholder. The quarry is one of an extensive group consisting of the stone quarries, sand and gravel pits, asphalt plants and ready mixed concrete plants. These operations are serviced by one of the largest fleets of heavy duty trucks and equipment along the eastern seaboard.

Permanente Cement Co. Plans $3,500,000 Expansion To Hike Output 25 Percent

Officials of the Permanente Cement Company have announced an expansion program which will augment its distribution facilities and provide an additional 5,600,000 sacks of cement a year for the continuously growing Western population, industry, business, and construction. The entire expansion program is expected to cost about $3,500,000.

Henry J. Kaiser, president, revealed the following details:

The Permanente Cement plant, located in the San Francisco Bay Area near San Jose, will be increased 25 percent in capacity. The expanded plant will produce 28,000,000 sacks of cement a year or 7,000,000 barrels.

A fifth giant kiln and other major equipment and additions will be added to Permanente's Bay Area plant to increase its annual production by more than 1,400,000 barrels (5,600,000 sacks).

The program also includes enlargement of facilities in Seattle, thereby carrying out expansion of Permanente Cement Company's established system of distribution plants which serve widespread markets from Northern California to the Pacific Northwest, Canada, Alaska, and Hawaii.

In order to meet the steadily growing demands for cement, the expansions are scheduled for completion in eight months—by February, 1951. This proposed program represents Permanente's fourth major expansion in a decade.

In view of the company's strong financial and cash position, the new program will not require any additional financing. The company presently has no funded debt or bank borrowings, and its sole capitalization consists of 1,400,000 shares of common stock.

The way was cleared for Permanente Cement to proceed immediately on the project when the Santa Clara County Board of Supervisors approved the action of the County Planning Commission in granting a permit for the plant expansion.

Nine Cement Concerns Cited for Annual Report Honors

From the almost 5,000 annual corporation reports for 1949 submitted in the tenth annual survey conducted by Weston Smith of *Financial World*, nine cement companies have qualified for "Highest Merit Award" citations: Bessemer Limestone, Consolidated Cement, General Port. Cement, Ideal Cement Co., Lehigh Port. Cement, Lone Star Cement Co., Marquette Cement Mfg., Missouri Port. Cement, and Permanente Cement.

The stockholder reports of these companies have thus become candidates for the final judging, and one will be selected for a "Best of Industry" award and presented with a bronze "Oscar of Industry" at the *Financial World* Annual Report Awards Banquet on Monday, October 30, 1950, in the Grand Ballroom of the Hotel Statler in New York.

• At Huachipato, 5 kilometers south of Concepcion, Chile, at the quarry of Cia Acero del Pacifico, Talcahuano, Chile, this "Caterpillar" diesel D8 tractor and No. 8A bulldozer are used to doze spoil material from the quarry into the sea.

National Safety Congress Scheduled for October 16-20

Plans for the 38th National Safety Congress and Exposition have been announced for this fall. Meetings will be held as follows on October 16, 17, 18, 19, and 20: sessions on industrial safety, Stevens, Congress, and Morrison hotels; traffic safety sessions, Congress Hotel; commercial vehicle, farm, and home safety sessions, LaSalle Hotel; school sessions, Morrison Hotel.

Those interested in obtaining further information are requested to apply to R. L. Forney, general secretary, National Safety Council, 425 N. Michigan Avenue, Chicago 11, Ill.

Marquette Cement Plans General Research Center

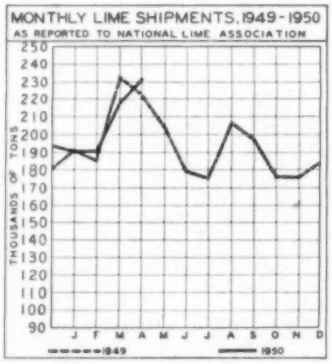
The Marquette Cement Mfg. Co. has announced plans for a new general research laboratory to be located in Des Moines, Ia., where experiments on product improvement, new products, better methods of production and new methods of quality control in the cement industry will be carried out. Set up as a part of Marquette Cement's $1,250,000 improvement and replacement program, the new lab will take the pressure of this work off the firm's other plant laboratories.

Bemis Laboratory Installs Climate-Control Equipment

For studying and experimenting with bags and bag-making materials under a wide range of atmospheric conditions, the General Engineering Research Laboratory of Bemis Bros. Bag Company in St. Louis has put into operation a new controlled-climate testing chamber with which it is possible to reproduce accurately the average climatic conditions encountered in most countries of the world.

The new equipment will be used principally to determine the protective qualities of all types of bags under various climatic conditions, and to test the effectiveness of fungus and mildew-proofing treatments.

The Lake City Lightweight Aggregate Corporation, Lake City, Tenn. now has its new Briceville, Tenn. plant in operation. Kilns and other equipment were installed in June. The firm will manufacture, from coal shales, a lightweight aggregate for concrete use, marketing it under the trade name of "LaLite."



According to data collected by the National Lime Association, 48 companies in April, 1950, shipped 232,653 tons of lime (137,050 quicklime; 95,603 hydrate). Reporting companies represent 60.3 percent of the association members' total capacity. Based on Pit and Quarry's estimate for the remainder of the industry, the total shipments were approximately 424,400 tons. Shipments by uses and grades for April, 1950, were:

	Quicklime	Hydrate
Agricultural	7,615	25,007
Building	15,870	42,841
Chemical	113,565	27,755
Total	137,050	95,603

N.S.G.A. Manufacturers Hold Directors' Meeting To Discuss Future Shows

On July 18 the directors of the Manufacturers' Division of the National Sand and Gravel Association met at the Palmer House, Chicago. Many items of business were discussed, including plans for the division at the convention in New Orleans in 1951. Consideration was also given to the next convention and an exhibit of machinery to be held in Chicago in 1952. A report was given on a questionnaire sent to the members of the division requesting comments on the last exhibit and suggestions for improving them in the future. All expressed themselves as well satisfied at the turnout and the interest shown. Only one complaint was received, from some practical joker, to the effect that so many producers came that they overcrowded the aisles.

At this meeting there was also some discussion on the possibility of holding a joint one-week exhibit with the National Crushed Stone Association in 1954. All board members present were in favor of this idea. Committees have been formed by both producers and manufacturers of the National Sand and Gravel Association and the National Ready Mixed Concrete Association to study this subject and discuss it with the crushed stone group.

In attendance at this meeting were the following: Vincent P. Ahearn, N.S.G.A. and N.R.M.C.A.; J. B. Bond (substituting for C. O. Friend), Nordberg Mfg. Co.; D. M. Blackburn, Hendrick Mfg. Co.; Morgan R. Butler (chairman), Butler Bin Co.; A. E. Conover (past chairman), Robins Conveyors Division; Ralph C. Johnson, Simplicity Engineering Co.; Wayne W. King (past chairman), W. S. Tyler Co.; C. B. Laird, Eagle Iron Works; J. C. McLanahan, McLanahan & Stone Co.; L. C. Mosley, Marion Power Shovel Co.; W. A. Rundquist, Pioneer Engineering Works; E. D. Stearns, Barber-Greene Co.

Massachusetts Concern's Plant to Crush Old Tunnel Diggings

Nearly a million tons of rock that have been idle for almost a century after being cut from the heart of Hoosac Mountain to make a tunnel will be used to build new highways in western Massachusetts.

Officials of Western Massachusetts Asphalt & Stone, Inc., have stated that use of the stone would cut costs of highway building in half.

Most of the stone was brought up from the heart of the mountain in the 24-year tunnel-making operation, which cost $15,000,000 and 195 lives. The tunnel, nearly a mile in length, was opened in 1875.

Officials of Western Massachusetts Asphalt & Stone have been granted permission to construct a stone-crushing plant near the huge rock pile.

From the State Capitals

COLORADO—With signing of an engineering contract, the Denver-Boulder toll road has moved closer to reality. Although authorized by the Colorado Legislature more than a year ago, the project had been held up by litigation until recently approved by the State Supreme Court. The toll road will be a four-lane divided highway, extending 18.3 miles from the Boulder city limits to Westminster on the outskirts of Denver. A two-mile connecting road will link it with Denver's valley highway. Total cost of the project, including engineering and bond fees, has been estimated at $5,750,000.

FLORIDA—Florida's State Improvement construction of a super highway and of $28,000,000 in bonds to finance the construction of a superhighway and bridge system at Jacksonville. State and federal contributions will provide the balance of revenue needed for the $41,818,000 project, which will serve both local and through traffic in Florida's gateway city for Eastern states. Involving the building of two new bridges across the St. Johns River and a third over Trout River, together with the acquisition of 6,000 separate parcels of real estate for 41 miles of right-of-way, the project will require three years or longer for completion.

INDIANA — Indiana's State Highway Commission has approved final plans for a test strip on U. S. 31 to determine the relative merits of concrete and black top paving materials, according to an announcement made by Commission Chairman Samuel C. Hadden. The test strip will be between Amity and the Columbus by-pass.

LOUISIANA—Louisiana's Senate has approved two proposed state constitutional amendments providing alternate methods for financing a $30,000,000 Lake Pontchartrain causeway. One of the proposals would submit to the voters in the November general election the provisions of a 1948-approved amendment to build the toll causeway, with full faith and credit bonds sold to the highest bidder. Offering an alternate financing method, the second proposal calls for issuance of revenue bonds to which the tolls from the causeway would be pledged and the full faith and credit of the state removed. Senator H. H. Richardson, author of both proposals, said that resubmission of the provisions of the 1948 amendment was necessary in order to clarify the route of the Hammond-Lakeshore highway project in connection with the causeway project.

NEW YORK—Plans for a record six-year school construction program in New York City have been sumitted by the City Board of Education's building committee. They call for 298 new buildings and additions to schools at an estimated total cost of $550,000,000.

Detailed plans and specifications for a mid-Manhattan elevated toll expressway will be prepared cooperatively between the Port of New York Authority and the Triborough Bridge and Tunnel Authority. This was agreed on by officials of the two agencies as the result of a conference with Mayor O'Dwyer. Construction cost of the highway, exclusive of tunnel connections, has been estimated tentatively at $26,000,000. Approximately $750,000 of federal planning funds will be available for use in planning and designing the proposed facility.

NORTH CAROLINA—Findings of a preliminary survey indicated that a proposed North Carolina cross-state toll superhighway "would be a sound financial investment," Charles F. Jones, president of the First Securities Corp., Durham, declared in a statement released through the office of Governor Scott. Jones announced that a full-scale survey now would be undertaken by Howard, Needles, Tammen, and Bergendoff of Kansas City and New York, and Cover and Colpitts of New York. He predicted a report on the survey would be available in early September, including recommendations to be submitted to the 1951 session of the North Carolina Legislature.

OKLAHOMA—Oklahoma's State Turnpike Authority has announced agreement on terms of a trust indenture and selection of consulting engineers. Governor Turner said lawyers were instructed to draft the indenture in final form and begin preparations for a State Supreme Court test of validity of the $31,000,000 Oklahoma City-Tulsa toll road project. The authority announced its employment of the Chicago engineering firm of DeLeuw and Cather as consulting engineers. The firm is expected to be retained as construction engineers for the toll road.

VIRGINIA—A complete highway modernization program in Virginia would cost $500,000,000 according to a report made public by the Virginia State Highway Department, which noted that only about $30,000,000 a year is now available for new construction on the rural roads of the primary system.

In a 20-year plan for developing Virginia's highway network, the commission has established ultimate standards for every primary route in the state. The plan has been operative since the end of World War II and has set the pattern for all postwar road construction in the state. However, the plan can proceed only as fast as available funds permit.

Cummins Co. Diesel Special Makes Racing History

New horizons for lightweight, high-speed diesel engines were opened as a result of the planned race run by the Cummins Diesel Special in the Indianapolis Memorial Day classic.

Although Car No. 61 of the Cummins Engine Company was forced out of the race by an accessory parts failure after 52 laps, company officials indicated satisfaction with the car's performance. They cited these facts: exceptional high speeds with smokeless combustion; new diesel speed records, with the official 129.208 qualifying average; use of only standard diesel fuel oil of the type burned in home furnaces; an engine which is one of the lightest (approximately 700 lbs.) and speediest diesels ever used in public competition; development of 340 horsepower plus at 4,000 r.p.m., with engine weight of 2.06 lbs. per horsepower.

L. W. Beck, vice-president in charge of sales, made the following statement: "We've worked on these developments in our laboratories in Columbus for a long time. Now we've proved them with an engine which is essentially a truck engine, even though it is much lighter and faster than its standard prototype."

The car and engine were built of light, new metals, using aluminum in head, block and pistons, and magnesium for the crankcase. Connecting rods, and the crankshaft were of steel.

The pit crew was under the direct supervision of D. J. Cummins, vice-president in charge of engineering, and included J. C. Miller, manager of research and refinement; N. M. Reiners, engineer in charge of the car; Thane Houser, Vernon Gressell, Robert Schmidt, and Arthur Eckleman.

The 1950 race was entered on a strictly competitive basis, and the entry was classified as a semi-stock car. It was the only experimental car in the race. The race car engine is a revised, highly supercharged version of the new JBS-600 engine, one of a diversified line manufactured by the Cummins company in the 50-550 horsepower range.

Sealtite Adds 20-Ton Cupola At Mineral Wool Plant

According to a Milwaukee newspaper, the Sealtite Insulation Manufacturing Company of Waukesha, Wis., has installed what was described as one of the world's largest cupolas for the blending of insulation materials at its Merton plant.

Company spokesmen stated that the 20-ton unit would increase the capacity of the plant to approximately 48 carloads per week of mineral batt.

Since its formation in 1944, the company has operated its plant on a 24-hour-a-day basis. It is currently producing mineral wool prepared in sections backed with aluminum foil.

Medical Science Discovers Important New Use for Talc

A newly-discovered use for talc in medical science was recently described in the Philadelphia press. According to the announcement, talcum powder has been blown onto weakened heart muscles to create a stimulating irritation, thus aiding victims of coronary occlusion.

Dr. Samuel Thompson, associate professor of surgery at the New York Medical College and professor of thoracic surgery at the Flower-Fifth Avenue Hospital, New York, described the technique at a meeting of an Eastern medical school alumni organization.

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

THE August, 1920, issue of PIT AND QUARRY was devoted largely to the concerted efforts of various nonmetallic minerals industries to effect the withdrawal of Order No. 7 of the Interstate Commerce Commission, which turned over most of the railway transportation facilities to the coal industry. In there pitching were the National Association of Sand and Gravel Producers, the American Sand Association, the Portland Cement Association, and various local groups and individual companies.

One of the plants described in this issue was that of the Casparis Stone Company at Casparis Station, Pa. The quarry was at the top of a mountain, 700 ft. above the railroad and a river. The plant, designed and equipped by Allis-Chalmers, was in two sections, the three stages of crushing and the screens between them being located on the hillside below the quarry. Bins at this location were used to load stone to a 150-t.p.h. Leschen tramway which carried it down hill to the final screening and loading building.

Also described was the nearly completed plant of the Monmouth Stone Company, Monmouth, Ill., which had six crushers and was expected to produce over 500,000 tons of crushed stone annually.

An inexpensive small gravel plant was that of F. F. Zanchi at Connellsville, Pa. Material was brought 25 ft. from the bank to the plant in wheelbarrows. Equipment consisted of a rotary screen with washing sprays, with the oversize going to a small crusher. Loam was removed from the sand in two flumes or troughs. First one was filled until the loam overflowed with the water. The flow from the screen then was diverted to the other trough, while the clean sand from the first one was discharged to stockpiles.

Another operating article described the methods used by the Floridin Company at Quincy, Fla., for removing overburden from its fuller's earth deposits. Shovels were used to load the overburden into a portable stripping machine said to be of a new type in 1920. It has been widely used since that time. It consisted of a rail-mounted hopper with a long boom convevor which overcast this material to a spoil bank in the pit beyond the loading face.

Two staff articles were of unusual interest. One discussed the comparative advantages of one large central plant in a gravel pit, as compared with several small plants in different locations. Another gave advice on the selection of steam shovels for quarries.

A news item told of the new bathing beach established in a worked-out pit by the Lincoln Sand & Gravel Company at Lincoln, Ill.

There was also a description of the efforts of the National Agricultural Limestone Association and the Lime Association to pass a national uniform lime law which was then thought to be important.

Reprinted in this issue were a number of letters from producers giving their opinions of bonus systems as a means of stimulating the effort and holding the interest of employees. Most of them had tried such systems unsuccessfully as far as the entire working force was concerned; but many of them found it advantageous to pay the superintendents and foremen bonuses as an incentive to greater output.

One article described the system used by the Consumers Company, Chicago, Ill., to use to the best advantage its fleet of more than 100 trucks and an unnamed number of horse-drawn vehicles. This system centered about a central dispatching office which was in constant telephone communication with the various yards. Also described were the servicing methods used which insured maximum life for each truck. Preventive measures did much to forestall costly repairs and replacements.

N.L.A. Operating Meeting Program Plans Announced

PLANS for the National Lime Association's operating meeting scheduled for September 18, 19, and 20 at the Nittany Lion Inn, State College, Pa., which is open to representatives of member companies, invited guests, and persons participating in the program, have been announced by Robert S. Boynton, general manager. Mr. Boynton states that William J. Ash, plant manager of the New England Lime Company, Canaan, Conn., is largely responsible for the program. The following sessions have been scheduled:

Monday, September 18—Morning session, L. N. Carmouche (Dow Chemical Company) presiding.

9 a.m. Registration.

10 a.m. Opening remarks by Mr. Carmouche, Operating Division chairman.

10:15 a.m. Lime Production Developments in Europe, Palestine, and Latin America, Victor Azbe. (This address will be based on information obtained from two foreign trips made by the speaker during the last year.)

11:15 a.m. Adaptation of the Air Slide, an address by an engineer from the Fuller-Kinyon Company, Catasauqua, Pa. (The device is a new low-pressure, pneumatic conveying system which offers promise for the lime and cement industries.)

Afternoon session, Arthur C. Hewitt (Warner Company), presiding.

1:30 p.m. A Study of Refractories, given by an engineer from the Mississippi Lime Company, St. Genevieve, Mo.

2:30 p.m. Panel discussion on the results obtained from the Kennedy Van Saun Preheater. Participating will be Paul LaLiberte (Cutler-Magner Company), Duluth, Minn., and John Gaisford (Lee Lime Corporation), Lee, Mass.

General discussion on preheating, led by Irving Warner (The Warner Company), Philadelphia, Pa.

Tuesday, September 19—Plant inspection tour of The Warner Company and National Gypsum Company plants at Bellefonte, Pa., starting at 8:30 from the Nittany Lion Inn, State College, Pa. Those attending will be divided into two groups, each of which will spend a half-day at each of these two interesting lime plants.

12:30 p.m. Group luncheon—courtesy of The Warner Company and the National Gypsum Company.

6:30 p.m. Group dinner and entertainment at the unusual Hatetoleavit Club (owned by the Titan Metal Manufacturing Company) through the courtesy of the National Lime Association. There will be liquid refreshments, excellent food, and good cheer at this mountain lodge.

Wednesday, September 20.

9 a.m. Election by the group of next year's Operating Division program chairman. Robert S. Boynton, general manager, will preside.

9:15 a.m. Discussion of lime calcination research at Massachusetts Institute of Technology by Professor James A. Murray, M.I.T.

10:30 a.m. Discussion of palletized shipments by David Cessna (engineer, Towmotor Corporation), Cleveland. The discussion will be illustrated by colored films and slides.

Dravo to Build 6 Barges For Warner Company Fleet

Dravo Corporation, of Pittsburgh, Pa., will build six welded-steel sand and gravel barges for the Warner Company of Philadelphia, the barges to be launched at Dravo's Wilmington, Del., shipyard.

Warner Company, one of the largest sand and gravel producers in the East, began a program of fleet modernization in 1923. Since that time, it has been gradually replacing its smaller-capacity wooden barges with new 1000-ton steel units "tailor-made" for Warner.

The six new 130- by 34- by 10-ft. barges will make a total of 43 vessels constructed for Warner by Dravo.

Japan Cement Engineering Association Holds Fourth Annual Convention

THE Japan Cement Engineering Association (J.C.E.A.) held its fourth annual convention at the Japan Industrial Club, Tokyo, on May 9-12, 1950, after the third general meeting of the member-manufacturers' technical division (May 8), with addresses and informal discussion on technical and engineering problems which had developed since last meeting. The convention was attended by approximately 300 persons, including representatives of member-companies, cement and concrete engineers, professors, government officials, and guests, from every district of Japan.

Presiding at the session was Mitsuzo Fujii, president of the association, who mentioned in a brief address of welcome, that this was the 50th anniversary of the association. The organization was established to improve manufacturing techniques and procedure, and to promote and improve the uses of portland cement and concrete through technical and scientific research.

Mr. Fujii, as a founding member, gave a brief review of the development of the association and the work accomplished by it in the past 50 years. He announced that plans for the erection of a new technical laboratory building are now under way, and that it is expected to be completed in November of this year. He pointed out that the year 1949 was in many ways the most favorable for the cement industry since the war. The removal of coal allocations and of price control, said Mr. Fujii, resulted in great increase in production, as well as in marked improvement of quality. Present prospects promise another high production record in 1950.

After the presentation of the business report and the 1950 project proposals by the executive secretary of the association, progress reports were submitted by all committees. Continuous activity in their respective fields were indicated, including new specification for portland, slag, and pozzolan cement; progress in cooperative investigations of mortar tests with standard and several local sands; correlating results of strength with different mix and water-cement ratios; report on comparative tests on the fineness of cement with Japanese standard air-analyzer, Blaine, Lea-Nurse, and Wagner apparatus.

The outstanding feature of the convention was an all-day technical session on cement and concrete. A high record was again set in the number of papers and the wide variety of subjects. Among 47 papers presented, 23 were directed toward cement and 16 toward concrete engineering problems. All indicated notable advancement in research investigations in the field and in laboratories. The program was arranged to permit adequate time for discussions.

Principal subjects covered in the session included the following:

A review of developments in the cement industry in the United States and Europe since 1940; seasoning effect of various types of cement of different fineness; characteristics of Japanese portland-pozzolanic cement; study of cement burning rate correlated with free lime content in clinker; X-ray study of hydration-products of blast furnace slag; rationalization of degree of fineness of cement and raw materials; influence of fineness of cement on concrete; special cements for large dams and their properties; large-scale theoretical and practical investigations on transmission of heat evolved in mass-concrete; electric curing of concrete in cold weather; air entrainment in concrete; study of vibration for precast reinforced concrete; factors affecting flexural strength of concrete beams; method of stress measurement of concrete structure; building with block-framed reinforced concrete; etc.

The next J.C.E.A. convention will be held in May, 1951, in Tokyo.

Western Machinery Offers New Laboratory Services

The Western Machinery Company announces the opening of a mineral testing laboratory serving the metallic and nonmetallic mining industries, the sand and gravel aggregate industries and others whose products or by-products require that type of material processing common in mineral engineering.

Company officials have explained that the purpose in opening the new laboratory is to provide a world-wide mineral testing service to industries in order to materially aid the problem of a lack of commercial mineral testing facilities that exists across the country as a whole. A newly created mineral testing department, located at 760 Folsom St., San Francisco 7, Calif., has been organized to operate the laboratory located at the Company's home office in San Francisco. The service is to be provided on a cost basis.

Wemco's new laboratory is equipped to investigate mineral engineering problems involving heavy liquid testing, heavy media separations, flotation concentration, gravity concentration, amalgamation, scrubbing, agitation and washing operations, wet classification problems, dewatering and thickening problems, crushing and grinding characteristics, cyanidation, preliminary microscopic mineralogical examinations, and others.

Permanente Cement Drivers Nation's 2 Safest Truckers

Permanente Cement Company truck drivers Al Winters and Hank Milovich recently garnered new safety honors for their outfit. Mr. Winters won top honors in the National Safety Council's Miles per Accident contest (inter-city truck division) for driving his 60-ft. 15-ton diesel truck 119,600 miles without an accident for the entire year of the competition period.

• Permanente's Milovich and Winters.

Runner-up in the contest was Mr. Milovich, who drove his truck with an accident-free record for the year over a total of 117,600 miles.

Resumption of fluorspar production has been announced with the reopening of the Fluxore mines in the Sierrita Mountains, 25 miles west of Tucson, Ariz.

WASHINGTON NEWS LETTER

By S. HERBERT UNTERBERGER

War Talk

THE talk in Washington is all war talk. People are saying to each other hopefully that this is not the beginning of World War III. And then they say: "But, it may be the curtain raiser."

Whatever the outcome, there is a new burst of activity in Washington, reminiscent of the beginnings of the last war. Military leaves are being cancelled. Civilian government officials are postponing their vacations or forgetting about them altogether. Even Congress has decided to stay in session, despite the desperate necessity of some members to go home and campaign.

While the State and Defense Departments are getting most of the attention, the busiest place in town is probably the National Security Resources Board. This is a civilian agency responsible for planning the mobilization of the nation's resources for war.

Until the recent appointment of Stuart Symington as its chairman, that agency has been headless for over a year. It was drifting. Its staff was doing the best it could, but without direction. But now it is operating on full steam, planning wartime legislation and emergency regulations, inventorying the nation's physical and human assets, arranging for civilian defense, and generally trying to do the million and one things that will make us ready here at home should full-scale war come.

As of now, one thing appears to be certain. Should a new full-scale war come, the limitations, regulation, and regimentation that are likely to accompany it will make the controls of World War II seem puny indeed.

Even war on a limited scale is likely to require the reimposition of many taxes and the re-enactment of many regulations. For example, even before the situation in Korea boiled over, there was much concern in Washington about the threat of further inflation. Now that concern has turned into a very real fear. It would be no surprise, therefore, if anti-inflationary measures are adopted very soon. It is unlikely that general price control will come back right away, but credit will very probably be tightened.

Also, for certain critical commodities, there will no doubt be some rationing to make sure that essential needs will be cared for. Such rationing will not be widespread. It is likely to be handled as a voluntary program, at least at first, unless the war problem becomes much more serious.

While the Korean situation has stimulated a great deal of activity, it has also stimulated much despondency. Many in Washington who went through World War II have that feeling that "this is where I came in." The prospect of war gives them no lift. All they see is more problems and more waste and more destruction. They think that the rigors of a new, more serious war is likely to destroy many of America's institutions, perhaps even Washington itself, and they fear that it may even destroy much of America's freedom.

Atom Defense Means New Construction

Even if war is not immediately upon us, the National Security Resources Board will carry on its planning. Being realistic, it is devoting much of its efforts to planning for defense against atomic warfare.

These planners are developing a program which on its face seems completely beyond our financial capacities. Its cost will exceed $100,000,000,000. However, when each of its parts are examined, they each appear to be absolutely essential. No doubt, then, this is the price for survival in the atomic age.

The planners tell us that underground shelters offer the only reasonable protection against atomic blasts. Since this is the case, provision must be made for everything essential to go underground.

First, there must be shelters for individuals. Ordinary basements do not offer enough shelter. At the minimum, concrete reinforcement is required. To provide more shelter, many communities are being urged to build subways, underground garages and sub-basements under office buildings and apartment houses.

For factories making critical supplies, there are two recommendations: (1) that they decentralize; (2) that they build underground plants. Other factories are told to reinforce their walls to protect machinery.

More and better highways are needed for rapid evacuation. More and better hospitals are needed to treat casualties. More and better fire fighting equipment and better water supplies are needed to cope with the danger of fire.

Unless this program gets underway, we are exceedingly vulnerable. No one here expects that it can get going all at once. But even if only a part of it proceeds, the construction industry and the pit and quarry industries will have much to keep them busy for a long time.

Increased Capital Expenditures

While there are, as yet, no reports of the building of underground factories, it is not too much to expect that many designers of factories above ground are taking the possibility of atomic war into consideration. In that case, they are giving their buildings an added measure of strength.

In general, by using newer materials and reinforcing methods new buildings are likely to be stronger than old ones. The post-war commercial building boom therefore has given our industrial plants much added protection.

It is encouraging, therefore, to find that this boom is continuing unabated. The Security & Exchange Commission and the Department of Commerce have just made a new survey of proposed capital expenditures, and they have discovered that many businesses have changed their plans.

A survey made some months ago indicated that expenditures for plant and equipment in 1950 were going to fall far below those of 1949. The new survey shows that expenditures for plant and equipment may not fall at all. If they do fall, it will be less than 5 percent below 1949.

In utilities and manufacturing, capital expenditures were expected to fall 6 to 7 percent. It is virtually certain now that in 1950 they will equal or exceed those of 1949. Even on railroads, where a 30 percent decline was expected, the actual decline will probably be less than 20 percent.

The effect on the various branches of the construction industry of this continued high level of commercial construction, plus the unprecedented level of housing construction is satisfactory indeed.

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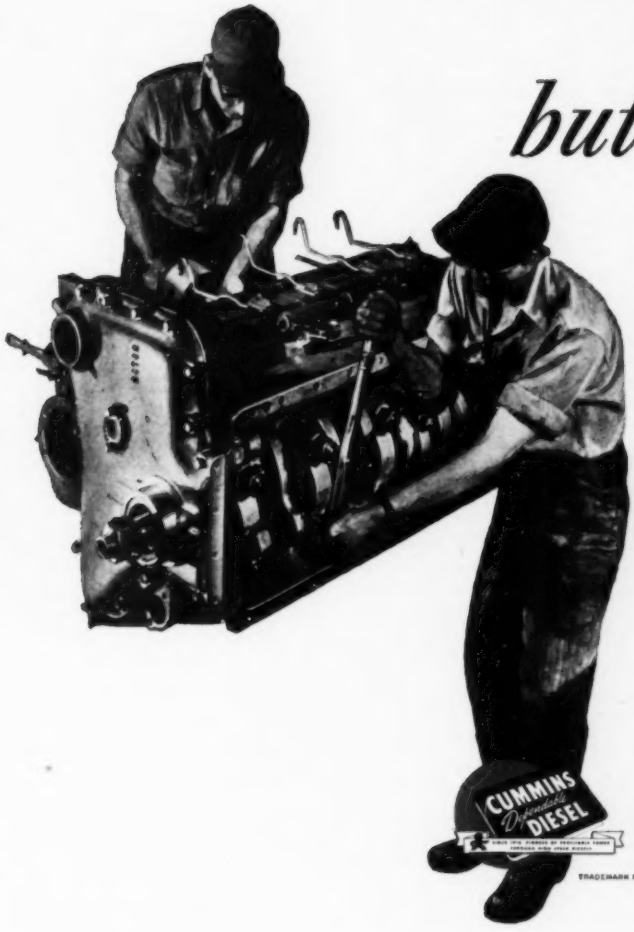

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Rock Drill Performance

Eastern Quarry Operator Effects Major Savings with New Type Drill

By WILLIAM M. AVERY

another ON THE SPOT removed

IN October, 1948, a few months after the formal unveiling of the Ingersoll-Rand Quarrymaster drill*, the M. J. Grove Lime Company placed one of the new units in operation at its limestone quarry near Frederick, Md. We recently called on James H. Grove Jr., manager of the company, to obtain a first-hand account of the performance of this important new quarry tool. The following account is based almost entirely on Mr. Grove's comments.

Prior to the purchase of the Quarrymaster the company had operated five well drills a major share of the time, and on occasion even six. Upon delivery of the new machine the number of well drills was immediately reduced to four, and by late November of the same year two more were removed from service. Until May of the following year the quarry operated with the Quarrymaster and two well drills. In that month one of the two remaining well drills was removed from service, and the following month the last unit was retired.

Since there was no important fluctuation in stone requirements or production during the period in which this change occurred, it is fairly obvious that the Quarrymaster wound up doing a job that had formerly required five to six well drills. Mr. Grove was careful to point out that the replaced equipment was somewhat over age, and was probably not yielding as much footage as it should have. The average per machine was very little more than 1 f.p.h. In contrast with this admittedly poor showing, the Quarrymaster in the first three months of operation averaged about 5 f.p.h. As the crew gained experience with the new equipment, the average footage increased perceptibly. The average for 1949, including down time, move time, change time, and all other factors, was a thumping 6 f.p.h, or roughly six times the footage previously obtained with conventional machines.

As might be expected, this tremendous gain is the result of a number of factors related to the performance characteristics of the two types of equipment, as well as to operating conditions in the Grove quarry. One of the reasons for the relatively poor showing of the well drills was the too-frequent necessity of abandoning holes after 45 or 50 feet of drilling, usually as a result of encountering a slip or some other type of fault in the rock. Such losses are substantially reduced in operations with the new machine, since one of its characteristics is that it *must* drill straight holes. If a slip is encountered near the surface, the fact is immediately apparent, and the location is abandoned at once, whereas with the equipment formerly used, considerable additional drilling was usually necessary before the situation could be appraised accurately.

The holes they are now drilling, Mr. Grove told us, are much straighter, and far more uniform from top to bottom, than used to be the case. Before the Quarrymaster was placed in service, holes could be, and frequently were closer or farther from the face than desired.

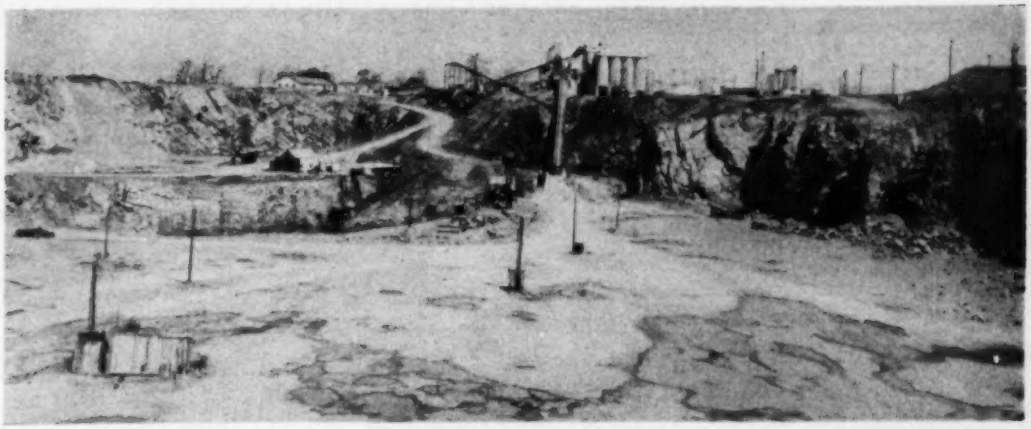
Another important gain is in move time—about 10 minutes between holes 15 to 18 ft. apart, as against an average of 30 minutes for the well drills. The factor of greater maneuverability and drilling speed also makes it possible to utilize the Quarrymaster as a wagon drill, which, in a sense, it is. In the Grove quarry it is common practice to move the machine forward from the main line of blast holes and drill 30-ft. holes to aid in breaking up the top stone. This procedure is credited with effecting about a 50 percent reduction in secondary drilling and blasting since the new equipment went into service.

The company uses 5½-in. diameter cross-type Carset tungsten-carbide-insert bits supplied by Ingersoll-Rand. It has found that these bits work best if they are touched up with a grinder after about 35 ft. of drilling. This job can usually be given to the helper,

*See Trauffer, Walter E.: *Editors of Technical Papers Attend Showing of New-Type Rock Drill*, PIT AND QUARRY, March, 1948, page 105.

• Front view of the new piston-type, air-operated drill in service at the Frederick, Md., plant of the M. J. Grove Lime Company. This self-contained unit carries its own drive, compressor and dust collector. In the Grove quarry it is drilling 5½-in. diameter holes to a depth of 80 ft. at the remarkable rate of 6 ft. per hour.

• Rear view of the new drill, showing the vertical hydraulic jacks used to level the machine.



• A general view of the Frederick plant, seen from the quarry floor.

who has actually little work to do except on change of steel. Despite the presence of a little more than 20 percent of coarse silica in the rock, some of the bits drill over 2,000 ft. of hole. The average, however, is around 1,400 ft.

The holes are drilled to a depth of 4 or 5 ft. below the floor of the quarry. At most locations this calls for drilling depths up to 80 ft., an important factor in any fair appraisal of rock drill performance. According to Mr. Grove, the average drilling rate of the new machine would increase about 2 f.p.h if the face were 40 ft. instead of 80 ft. The holes are spaced 16 ft. apart in a single row with 20-ft burden. They are fired at intervals of about three weeks, an average blast running from 10 to 20 holes.

Grove uses the Rockmaster delay system in all its blasting operations, employing as many as 16 millisecond delays whenever conditions permit.

The Quarrymaster is a piston-type, air-operated drilling plant mounted over crawler treads. It is a self-contained unit, carrying its own drive, compressor, and dust collector. Air is admitted continuously to the hollow drill stem to remove cuttings from the hole, thus enabling the unit to operate without water. The machine is levelled by means of four vertical hydraulic jacks, one mounted at each corner. The 42,000-lb. machine travels at one m.p.h., and it can negotiate grades up to 30 percent.

Although the unit is usually supplied with a diesel drive, the machine operated in the Grove quarry is driven by an electric motor. To accomplish this the company put up special power lines and transformers. A 600-ft. length of rubber-covered cable feeds power to the portable drilling plant, providing a wide radius of operation without relocating the cable. Mr. Grove believes that the electric drive has certain advantages over diesel in this particular application. Since it eliminates any necessity for water at the drilling site, there is no danger of freeze-ups during cold weather operations.

Other recent additions to the company's quarry facilities include a 1½-cu. yd. Koehring 605 shovel

(*Continued on page* 80)

• Right: Loading operations as seen from the rim of the quarry. Note the excellent fragmentation in this bank of material.

• Below: Stripping overburden with the company's new 1½-cu. yd. shovel. Quarry-type, end-dump trucks of the type shown haul 15 tons per load, and are used for hauling both overburden and rock.

NEW FINE GRINDING METHOD

another ON THE SPOT report

THE general practice in most industries, including those producing nonmetallic minerals, is to design a plant and select the equipment to process a certain raw material and make certain products from it. When the reverse is true, that is really news. This reverse order was followed by the R. T. Vanderbilt Company, a research, manufacturing and sales organization of New York City which specializes in industrial minerals, when in 1947 it became interested in a new type of grinding mill recently put on the market by the C. H. Wheeler Manufacturing Company of Philadelphia. This "fluid energy reduction mill," as it is called by its inventor N. N. Stephanoff, has no moving parts and uses compressed air to make particles of the materials processed batter each other to dust. Vanderbilt officials reasons that this mill could produce micron and submicron sizes of talc for special uses economically and on a commercial scale. With true American enterprise, Vanderbilt leased a suitable deposit which it had recently examined at Balmat, N. Y., about 8 miles southeast of Gouverneur and in the heart of the great New York talc-mining district. A plant was designed around this mill, and construction began in August, 1947. It is operated by the Gouverneur Talc Company, a subsidiary.

By July, 1948, the first ore was being hoisted out of the mine; and in September, 1948, the initial shipment of finely-ground talc was made from the 200-ton-per-day plant. The potential mine capacity is nearly double that of the plant, to provide for future expansion. Five grades of ground talc are made under the trade name of NYTAL (New York Talc). Three of these grades—No. 300, No. 400 and No. 500—are made by the new air-attrition mills. Their average particle sizes, determined by the sedimentation method, are 6.0, 1.5, and 0.8 microns, respectively. (A micron is about one twenty-five-thousandth of an inch). These products are sold for a wide variety of purposes, including the manufacture of paints, ceramics, cosmetics, rubber, insecticides, paper, etc.

The property controlled by the Gouverneur Talc Company adjoins that of the St. Joseph Lead Company, which operates a zinc mine and plant nearby. The talc company's property contains three ore bodies, one of which—the American—had been worked to shallow depths in previous years. Another was known to exist but had never been worked; and a third was discovered by St. Joseph Lead miners in the course of their underground exploration work in connection with their zinc mining operations. This latter

Gouverneur Talc Company's new plant is built to fit the "fluid energy mill" in which violent air jet action causes particles to pulverize each other

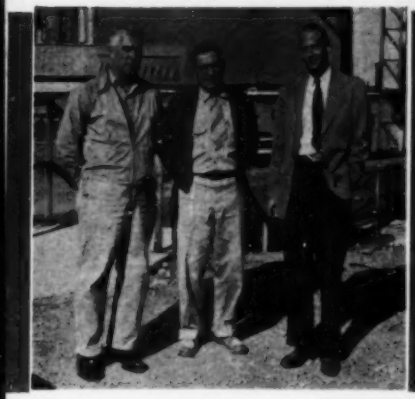
By
WALTER E. TRAUFFER

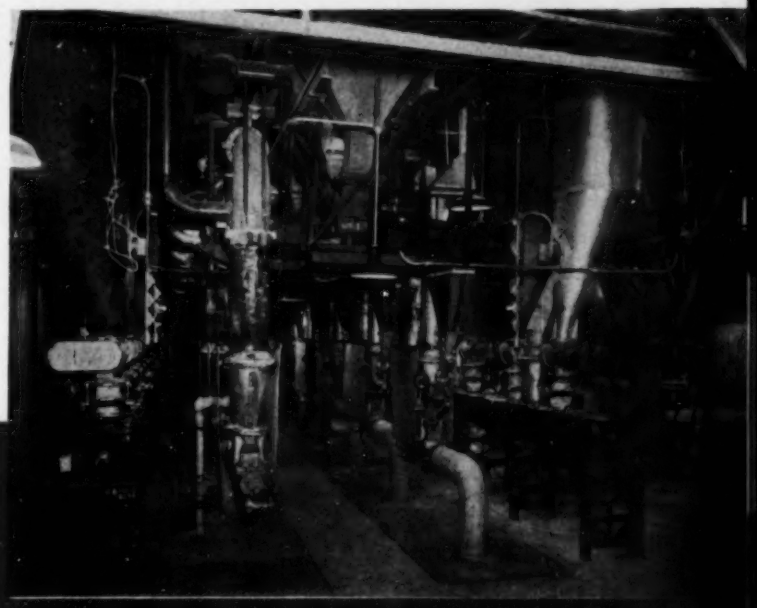
Opposite page: A general view of the Gouverneur Talc Company's plant at Balmat, N. Y., with the mine tipple at the left. A zinc mine and plant is in the background.

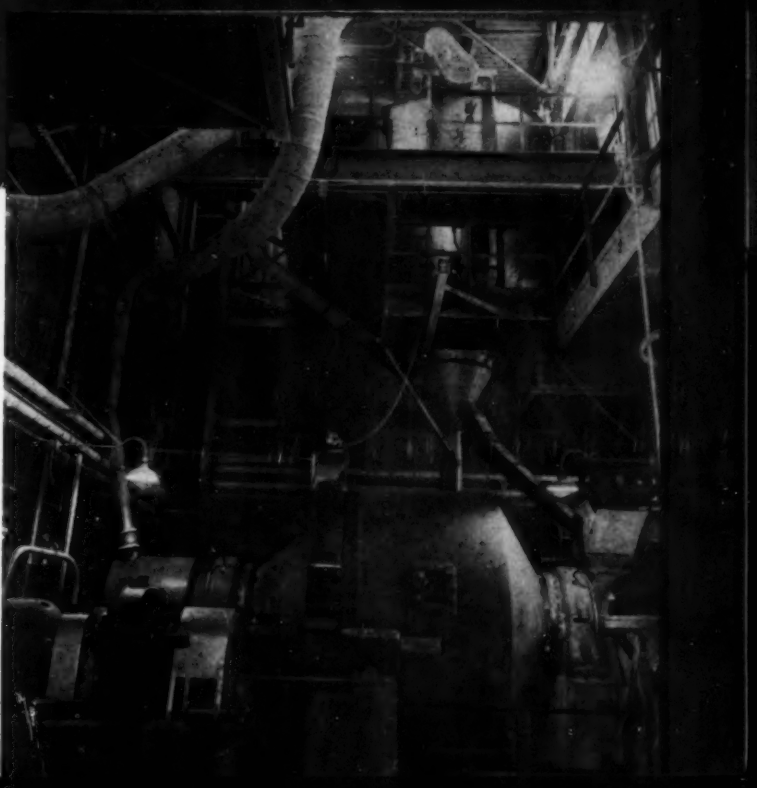
Right: In this view are shown all of the 14 fluid energy mills with their feeders, air inlets, outlets, cyclone collectors, and conveyors.

Right, below: Preliminary grinding of the talc is done in this 10-ft. by 66-in. conical mill with its feeder at the right and the 12-ft. separator above.

Below: Responsible for the construction and operation of this plant are (left to right) John Bulger, mine superintendent, J. A. Gustin, mill superintendent, and R. S. McClellan, vice-president and general manager.







is the main ore body. These three bodies are in the form of parallel veins varying from 15 to 80 ft. in thickness and dipping at about 45 degrees to the northwest. They are about 400 ft. apart and have strong limestone hanging and foot walls. Enough ore is assured for more than 30 years' operation. Most of the production to date has come from the American ore body, but the main (third) vein will soon become the chief source of supply.

The ore bodies were investigated under the supervision of R. S. McClellan, vice-president of Gouverneur Talc, who was also in charge of the mine development and the design and construction of the plant, and is now in charge of all operations. An 80-ton sample of the main

Air drills being used to drive a development head in one of the two levels of the mine.

Right: The 3-ft. diameter gyratory primary crusher which reduces ore to minus 1-in. size.

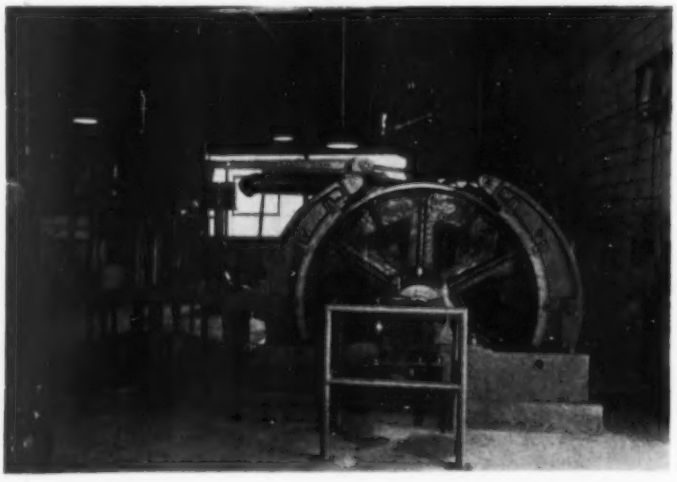
ore body was secured through the cooperation of the St. Joseph Lead Co., and grinding tests of the ore were made by the C. H. Wheeler Mfg. Co. The 600-ft. vertical concrete-lined shaft was sunk by the Underpinning & Foundation Company; and James Stewart & Company, Inc., also of New York City, did all the surface construction work.

In developing the mine the first step was to dewater the old inclined shaft on the American vein and the eight levels which were flooded. This was done by driving a tunnel from the 300-ft. level of the new 600-ft. vertical shaft to within 40 ft. of the old workings. A hole was then cut the remaining distance with a diamond ore drill. An air jet was used to bring the water to the surface through a pipe. When the water level dropped to the 150-ft. mark the dewatering was carried on by pumping.

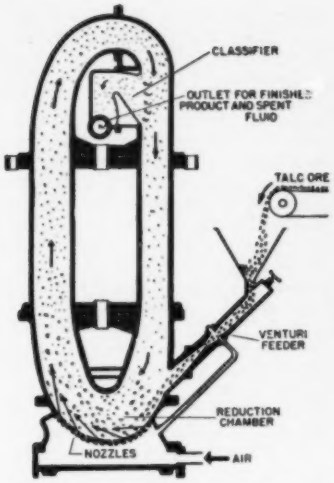
Mining

Development of the main and American ore bodies from the new vertical shaft is being carried on at the 300-ft. and 500-ft. levels by open-stope mining methods. The dip is so flat in many places that slusher air hoists and scrapers must be used; these are of Ingersoll-Rand and Sullivan manufacture. Ingersoll-Rand JB4 Jackhammers with 1⅜-in. standard steel Jackbits are now used for blast hole drilling, but the use of diamond drills is contemplated. Tramming is done on both levels with 2-ton Granby cars and Mancha electric battery locomotives, the haul to the shaft averaging about 400 ft. On each level the ore is dumped over a 10-in. grizzly into a 125-ton loading pocket. Under each loading pocket is a 3-ton measuring pocket from which the 3-ton skip is loaded. All pockets have air-operated gates. The self-dumping skip carries the ore to the surface, where it is discharged into a 25-ton tipple in the headframe.

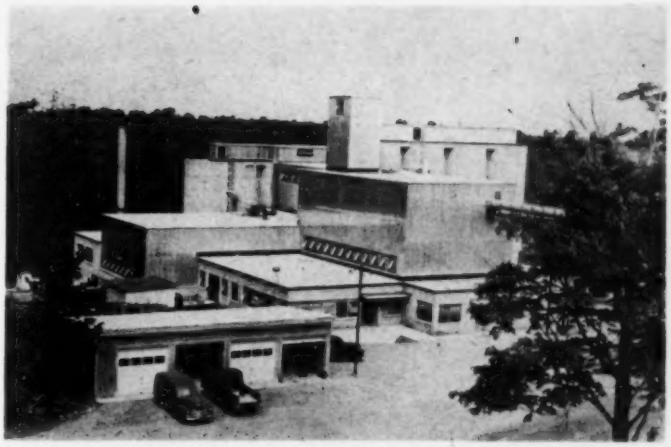
The shaft is lined throughout with 12 in. of reinforced concrete, which minimizes the water problem. Pumping requirements range up to 75 g.p.m.; this work is taken care of automatically by four Ingersoll-Rand motor pumps with considerable reserve capacity. The shaft has three compartments—one for the skip, one for the counterweight, and one for a manway. There are steel ladders the full depth of the shaft and platforms every 12 ft. Compressed air and water lines are



The automatic mine skip hoist which operates at a maximum speed of 600 f.p.m.



This drawing illustrates the method of operation of the "fluid energy" mills in this plant.



The main mill buildings, with the offices in the foreground and storage silos in the background. The conveyor at the right carries talc ore from the crushing building at the mine tipple.

imbedded in the concrete lining. The Ottumwa Iron Works automatic skip hoist is driven by a 125-hp. motor and operates at a maximum speed of 600 f.p.m. Air for all mine operations is supplied by a 1000-c.f.m. Ingersoll-Rand Type XRE two-stage compressor driven by a 200-hp. G. E. synchronous motor.

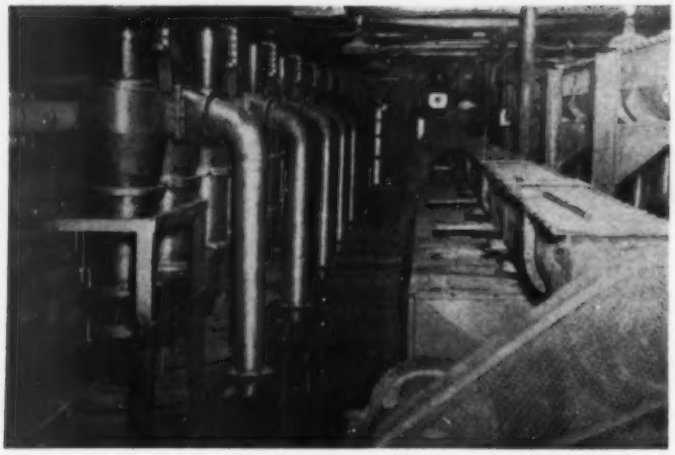
Plant

The ore is drawn from the tipple by a grizzly feeder with 1-in. openings and discharged into the 3-ft. dia. Traylor gyratory primary crusher. The crusher product and grizzly throughs—both minus 1-in.—drop on the first of two sections of the 20-in. belt conveyor which has a total length of 400 ft. Both sections are completely enclosed, and the second section carries the material across a highway to the main plant. Tramp iron is removed by two Dings suspended-type magnets—one over the grizzly and the other over the belt.

A tripper at the end of the second conveyor section controls the discharge of the material into three 100-ton wet ore storage bins. Jeffrey vibrating feeders reclaim the ore from these bins to a conveyor and elevator feeding a Tyler Niagara screen. The undersize from the screen goes direct into a 5- by 25-ft. direct oil-fired Ruggles-Coles rotary drier. Moderate heat is used in drying, the discharge talc having a temperature of 250 deg. F. The exit gases go through a Buell dust collector and rejoin the dryer product.

The oversize from the screen drops into a bin from which a Hardinge constant-weight feeder discharges it into the 3-ft. Symons short-head cone secondary crusher. The 5-mesh product of this crusher, together with the dryer product, goes to a Tyler Hum-mer screen with ⅛-in. openings. The oversize goes back to the bin ahead of the secondary crusher. The minus ⅛-in. undersize from this screen is delivered by screw conveyors and bucket elevators into four 500-ton dry ore silos of concrete construction.

A closeup of one of the 14 "fluid energy" mills, with the venturi feeder at the right (top) and the compressed air inlet at the right (bottom).



The separators above the mills which remove fine talc from the circuit and the conveyors which carry it to the pumping system feeding the storage silos.

Samples are taken at the conveyor discharge over the wet ore bins by means of a scoop-type mechanical sampler of the company's own design.

The dry storage silos have conical bottoms with a 60 degree slope to facilitate withdrawal and eliminate bridging and consequent flooding of the fine ore. Jeffrey vibrating feeders control the withdrawal of the material from these bins, either separately or in any desired combination for blending purposes. A series of screw conveyors and bucket elevators feed the talc to the two final grinding departments—the "fluid energy" section for micron sizes, and the regular grinding department for "coarser" sizes.

For the latter department the talc is discharged into a 5-ton bin from which a Hardinge c/w feeder discharges it into the 10-ft. by 66-in. Hardinge conical mill. French flint pebbles are used for grinding media and the mill has Silex liners. The pebble load is 30,000 lbs. The mill product goes to a 12-ft. Raymond separator with a double whizzer which is closed circuit with the mill. The coarse material is returned by gravity into the mill. The finished product is discharged from the separator onto a Tyler Hum-mer screen for removal of any foreign matter. A 5-in. Fuller-Kinyon pumping system transports this material to one or more of the 500-ton concrete finished product silos. The No. 100 and 200 sizes of NYTAL talc are made in this department.

Fluid Energy Grinding

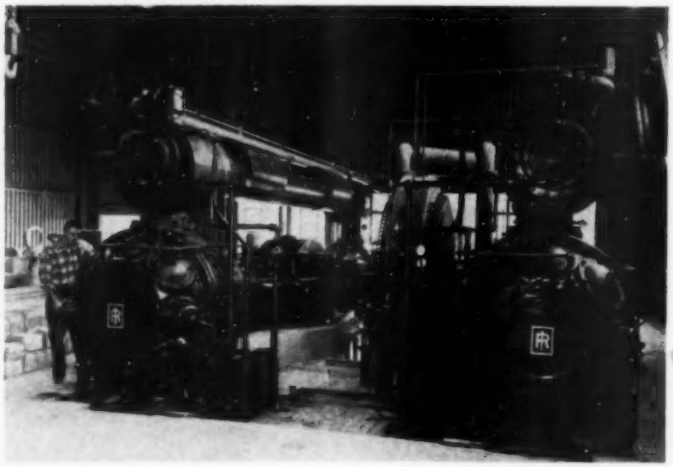
Ore for the Wheeler mill department is discharged from the series of screw conveyors and bucket elevators into the individual feed bins of the 14 Wheeler mills. These bins are arranged so that excess material overflows to a screw conveyor feeding back into the circuit, thus insuring a constant feed. Jeffrey Waytrol feeders discharge into the mill feed hoppers. These mills are about 8 ft. high and resemble oversize chain links or elongated doughnuts. Each mill is made up of three sections of cast alloy steel, which, when put together, form a hollow casing of variable cross-section similar to that of a wind tunnel. A reduction chamber in the lower section of the mill has several nozzles placed at an angle to the path of the air in the mill. Hot air at high pressure comes out of these jets at a speed of about 1600 ft. per sec. (1100 m.p.h.). Inside the mill this air whirls around at velocities of 150 to 400 m.p.h.

The crushed talc ore enters the mill through a venturi-injection system near the bottom. This talc is picked up by the air from the jets and set in violent motion. These particles collide with each other and with those already circulating through the mill at terrific speeds and break one another to bits. Most of the actual breakage occurs in the reduction chamber. There are never more than a few pounds of talc in a mill at one time, but the velocity is so great that up to 6 tons will pass a given point in one minute.

The method of withdrawal of the finished material is ingenious. As the mill is operated, air is continually being withdrawn through an opening in the inside wall in the top section. Particles passing by this opening are subjected to two forces: inertia, which helps to keep it on its course, and the drag of the air leaving the mill. The latter is adjusted to the desired rate for a desired size; and when a particle reaches this size, the air drag overcomes the inertia of the particle and it leaves the mill.

The air for the entire battery of mills is supplied by an Ingersoll-Rand PRE-4C 2-stage, 4-corner compressor with a capacity of 7150 c.f.m. at 150 p.s.i. discharge pressure, which is driven by a G. E. 1750-hp. synchronous motor. Air is drawn in from the roof of the plant through an American Air Filter Company Airmat dry-type separator and then through two American Cycoils which are oil-bath-type filters.

(*Continued on page* 64)



Air for the battery of "fluid energy" mills is provided by this 7150-c.f.m. compressor at a pressure of 150 p.s.i.

Vermiculite Institute Speakers Discuss Techniques, Promotion, and Markets

THE annual meeting of Vermiculite Institute was held in Washington, D. C., May 1-4, inclusive, and was attended by members from all parts of the United States and Canada. W. R. Simpson of Washington, president of the institute, presided.

A. T. Kearney, president of Zonolite Company, Chicago, who spoke on Monday, said that great progress had been made by the industry in standardizing its products.

"This is of public interest," Mr. Kearney stated, "Because the architect, engineer, contractor, and owner can be certain that no matter where vermiculite is used geographically, material produced by members of this institute will be uniform and meet requirements of local building codes."

Mr. Kearney explained that new mining and milling techniques have been developed to standardize crude ore shipped for processing, and that processing methods, too, have been steadily improved. Bag sizes and content have been standardized, and weight and screen analysis of processed vermiculite made to conform to specifications of the American Society for Testing materials, he said.

In commenting on the fact that all institute members had recently subscribed to the re-examination service of the Underwriters' Laboratories for vermiculite plaster aggregate, to insure that it continues to meet the standard which secured official 3- and 4-hour fire-resistive ratings for vermiculite plaster, Mr. Kearney said:

Stanley K. Robinson, F. Hyde & Company, Montreal, Canada, the newly-elected president of the Vermiculite Institute.

"The importance of this becomes apparent when we realize that about one-fourth of all the neat gypsum plaster produced in the United States is mixed with vermiculite aggregate."

Other Monday morning speakers were J. B. Lyall, Northwest Insulation Company, Spokane, Wash., and C. H. Wendel, California Zonolite Company, Sacramento, Calif.

A. A. Hood, Chicago, editor of *American Lumberman* and guest speaker at the afternoon session, said that American business has been traveling for eight years on the overdrive and must shift its selling machinery into powerful low gear for an uphill pull. He stated that industry's greatest field for marketing improvement is the area between factory doors and ultimate consumer, and urged integration of marketing procedures. Mr. Hood asserted that if success could be reduced to a formula, it would contain expansion of investments in sales promotion, thrifty curbing of all costs except sound investments in advertising and sales promotion, elimination of distribution wastes, and passing on cost savings to consumers in the form of lower prices.

The construction and insulation industries have a big market in farm buildings, H. W. Steiff, sales manager, Western Mineral Products Company, Minneapolis, said in discussing *The Fabulous Fifties.*

"The main difference between 1900 animal shelters and the 1950 model is the amount and location of the insulation," he asserted. "Take farm building floors as an example. For years, the farmer's most vexing problem was the cold, wet, uninsulated floor. It not only made frequent bedding changes necessary, but increased the amount of animal sickness and mortality. Today, vermiculite insulating concrete floors eliminate this problem."

Charles M. Mortenson, managing director of The Producers' Council and second guest speaker on the program, commented on the unusual interest in vermiculite products that had been displayed in regional meet-

Vermiculite Institute members attending the annual meeting in Washington, D. C., standing before the Lincoln Memorial.

ings held in Chicago, Minneapolis, Detroit, Dallas, and other cities, and discussed the services rendered by the council to manufacturers.

At the Wednesday morning session, G. R. Stark of the Texas Vermiculite Company, Austin, Tex., and chairman of the planning committee, which co-ordinates the activities of the institute, presented the committee's report. He discussed particularly the new curtain wall construction using vermiculite concrete panels.

"This type of construction," Mr. Stark said, "not only greatly reduces the weight on structural members of the building, but provides increased fire protection and five to six times more insulation value than the conventional exterior wall. The cost of heating and air-conditioning is reduced due to this increased insulation value. An available type of curtain wall incorporating vermiculite concrete panels encased in a steel frame and securely welded to the main structure is one way to secure the 'quake-type' buildings recently urged by the Department of Defense and the Atomic Energy Commission as a defense against A-bombs, for it will withstand great shock and pressure and eliminates the hazard inherent when small wall units are used."

Mr. Stark said that vermiculite concrete panel construction weighs about 15 lbs. per sq. ft., as compared with 80 lbs. per sq. ft. of wall area for the conventional exterior wall. The cost per sq. ft. of a vermiculite concrete curtain wall is also less, he added.

J. B. Myers, Zonolite Company, Libby, Mont., discusses standardization of vermiculite products at the annual meeting.

C. A. Pratt, chief engineer, Western Mineral Products Company and chairman of the institute's standardization committee, was joined by R. E. Rea, engineer, Zonolite Company, Chicago, in a discussion of the advantages of the new light-colored vermiculite acoustical plastic being produced by most of the industry. Following the discussion, members voted unanimously to standardize on vermiculite acoustical plastic containing the white pigment. The industry also approved a new research program for vermiculite concrete and plaster aggregates, designed to obtain additional information and improved products.

Other speakers at the Wednesday session were J. A. Kelley, Carolina Vermiculite Company, Travelers Rest, S. C.; W. R. Simpson, Vermiculite Products Corporation, Washington; J. B. Myers, Zonolite Company, Libby, Mont.; and D. L. Prouty, Zonolite Company, Dearborn, Mich.

At the business meeting, Stanley K. Robinson of F. Hyde & Co., Montreal, Canada, was elected president; Walter J. Bein and Edward R. Murphy were named treasurer and executive secretary, respectively; and C. A. Pratt and John Myers became two new members of the board of directors. Other directors making up the five-man board are Stanley K. Robinson and F. H. Robinson of Robinson Insulation Company, Great Falls, Mont., and G. R. Stark.

The annual banquet was held at the Kenwood Country Club. An overnight boat trip to Old Point Comfort and Williamsburg, Va., terminated the meeting.

New Fine Grinding Method

(*From page 62*)

This insures that no talc dust or other foreign matter will get into the compressor cylinders. The air is heated to give it greater velocity by means of an Alcorn oil-fired heater using No. 4 oil. This heat also insures that the material is as dry as possible.

The finely-ground talc leaving the Wheeler mills goes through cyclone collectors. The finished product is then carried by screw conveyors to a Hum-mer screen with 30-mesh cloth which removed any foreign matter. The finished product through this screen is carried by an 8-in. Fuller-Kinyon pumping system to the four 500-ton storage silos previously described. Samples are taken by a Fuller sampler.

All products from both grinding departments are packed for shipment with the same equipment. An 8-in. Fuller-Kinyon rail-mounted portable pump under the silos withdraws from any of them to a bin over the 4-tube St. Regis packer. An upper- and lower-level indicator automatically controls the feed. The products are packed in 3- and 4-ply 50-lb. sewed valve bags which vary in size for the different finenesses of material. The filled bags drop onto a wire mesh conveyor and are carried on roller conveyors into box cars for shipment. Bulk shipments are also made in paper-lined box cars.

Three Sly dust collecting systems keep the plant as nearly dustless as possible. One system is connected to the primary crushing section, one to the main plant building, and one to the Wheeler mill circuit. All other measures are taken to make the entire operation clean and pleasant to work in. All buildings, conveyor housings, etc., have Robinson flat aluminum siding with fibre glass insulation and corrugated sheeting inside. In cold weather all operations are heated by two Ames 50-hp. low-pressure boilers.

Laboratory

A complete control laboratory is maintained at the plant to insure the quality and gradation of the products. Gradation of submicron sizes is checked with a Fisher sub sieve sizer. Another instrument measures the viscosity of paint samples made with the talc. Another indicates the power of talc to reflect light, and still another shows how much oil is needed to wet down a certain amount of each grade of talc.

Officers

It has been stated that the Gouverneur Talc Co. is a wholly owned subsidiary of the R. T. Vanderbilt Co. of New York City. Other Vanderbilt-owned operations in the nonmetallic minerals industries are the Standard Minerals Co., Robins, N. C., producers of pyrophyllite, and the Dixie Clay Co., Bath, S. C., producers of kaolin. Officers of the Gouverneur Talc Co. are as follows: R. T. Vanderbilt, president; F. B. Vanderbilt, vice-president; R. S. McClellan, vice-president and general plant manager; and F. C. Gens, treasurer. John Bulger is mine superintendent, and J. A. Gustin is mill superintendent.

Officials of the Aliceville Sand and Gravel Company have announced that the firm is now at its new location, 21 miles east of Macon, Miss., and just south of Alabama highway 17.

Fuel Efficiency and Kiln Production Improved by Modernization

C. R. ATHERTON
Atherton & Evans, Annville, Pa.

LIME production at the Rockwell Lime Company, Manitowoc, Wis., is based upon the operation of massive shaft kilns constructed of local limestone at the beginning of the century. Until the spring of 1949 these kilns were charged with hand-picked stone and operated under natural draft. The kilns were, and still are, hand-fired with cord wood which is shipped by railroad from the northern section of the state.

A program of plant improvement begun in 1948 included plans for an experimental attempt to eliminate the necessity for hand selection of stone and to improve the fuel efficiency of the kilns. Consideration was also given to the possibility of changing from manual firing of cordwood to mechanical firing of hogged fuel, but careful analysis indicated that such a course could not be economically justified and the project was dropped.

The Installation The No. 3 kiln was selected for the experiment and was shut down for modification. An 8- by 6-ft. shaft approximately 24 ft. in height above the grate bars was laid up with header brick and backed with grog obtained by grinding the old brick removed from the kiln. The 14- by 15- by 9-ft. stone storage section was maintained unchanged. Under these conditions the volume of the kiln was only slightly altered.

Closure of the kiln top was effected by means of a fabricated steel cover supported on structural steel beams and fitted with a close-sealing kiln door. Every attempt was made to prevent air leakage through the body of the kiln or the kiln top. The kiln charging door is opened and closed by an electric motor with a magnetic brake which is actuated by push-button controls placed at the hoist car dumping point.

At the rear of the kiln roof an 8-ft. purge stack with damper rises vertically from the kiln top. The gas offtake duct which leads to the induced draft fan enters the purge stack below the damper. Induced draft is provided by a Sturtevant planing mill exhauster located at the firing floor level. Kiln gases are vented through the roof of the kiln shed.

During initial firing or emergency shutdown of the fan, the damper in the purge stack may be opened and slow firing continued. In normal operation the fan provides induced draft and operates continually except when the charging door is opened. At such times the fan is automatically stopped by a limit switch as the door opens and similarly restarted when the door closes.

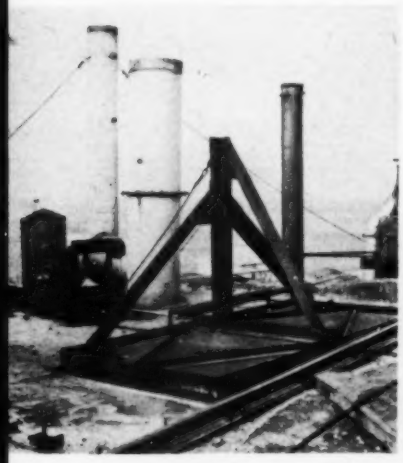
Draft control is provided by means of a manually-operated damper on the suction side of the fan.

Kiln top draft and temperatures are recorded by a Hays draft recorder and Leeds and Northrup temperature recorder, respectively. The nature of the installation is such that the former instrument also indicates each car of stone charged to the kiln.

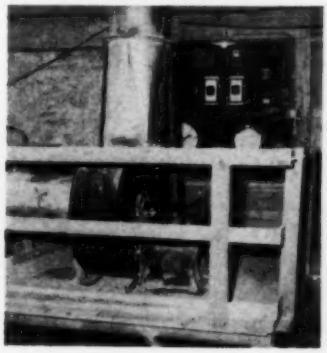
The Experiment The modified kiln was placed in operation on mechanically selected stone obtained by passing the run of the 18- by 32-in. primary jaw crusher over a screen having a 3-in. square openings. This size was selected as being the smallest which might be expected to give satisfactory results. A protracted test on this material indicated that fuel efficiency was somewhat improved. However, the kiln was subject to gas "channeling," was very sensitive, and proved unreliable. Several days' production of virtually core-free lime would be followed by the appearance of core, and later of raw stone in the discharged product. Kiln conditions would then right themselves and the cycle would repeat.

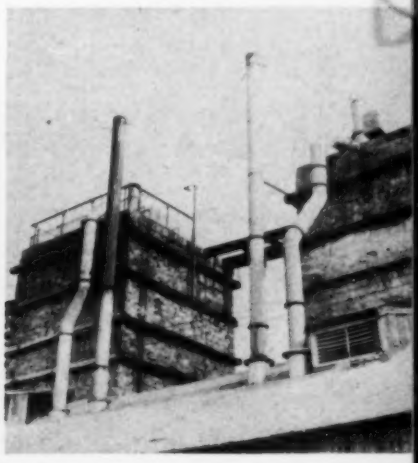
After a period of about two months the use of this size of stone was abandoned as impracticable and the kiln was emptied. Screen size for kiln stone was increased to plus 4-in. and the kiln was recharged and refired. Performance was much improved, and the kiln has been

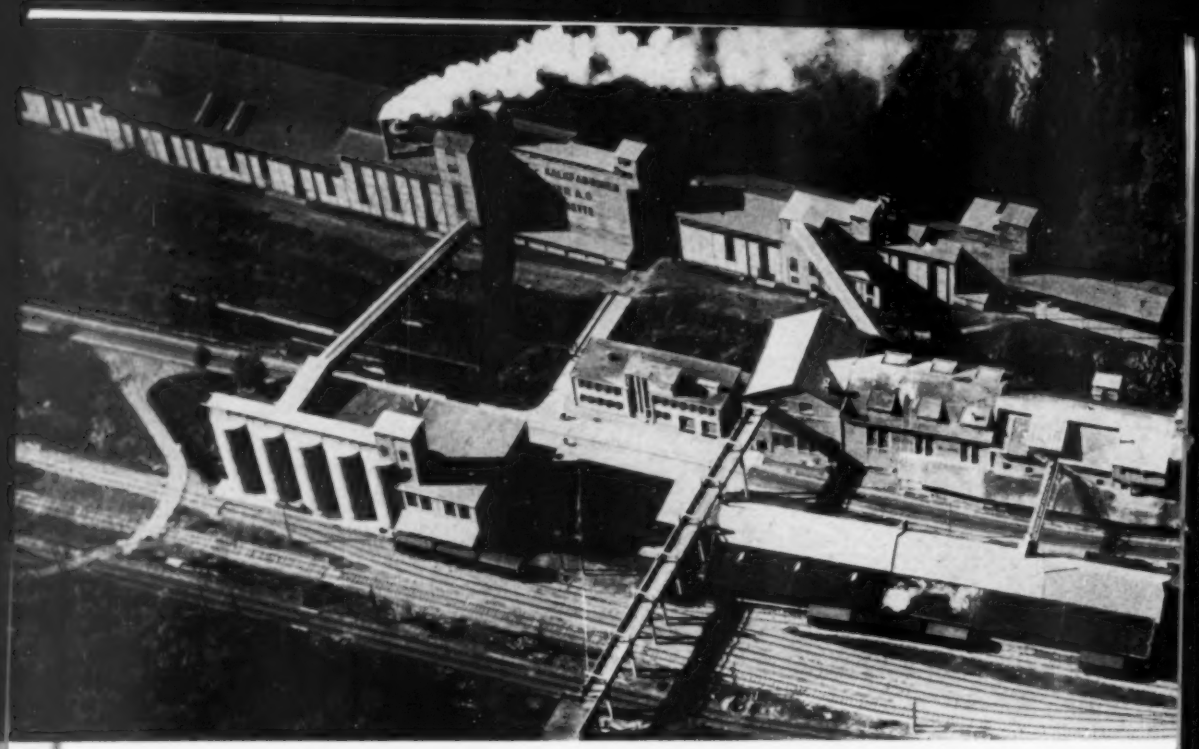
(*Continued on page 75*)



• Left: A view of the top of the No. 3 kiln, showing the method of kiln closure.
• Below: Induced-draft fan and kiln control panel.
• Right: No. 2 and No. 3 kilns, showing the gas offtake and the exhaust ducts.







A World-Wide Review of the Portland Cement Industry

PART 1—EUROPE
CONTINUED

SWITZERLAND

PORTLAND cement was first produced in Switzerland in 1871, and the first rotary kiln was installed in 1906. Now there are 12 companies operating 15 plants, with a total capacity of about 1,250,000 metric tons annually. Production in 1949 was about 950,000 tons, slightly under the 1,000,000-ton figure of 1948 and the 994,790-ton total of 1947. In 1888 the 29 plants with their 1,070 workers produced 150,000 tons. In 1911, 62 plants with 3,949 workers had an output of 857,200 tons. In 1939 there were 43 plants with 1,622 workers; production was 1,002,000 tons.

Before 1930 the capacity of the industry greatly exceeded demands, and large quantities of cement were exported. The record was attained in 1917, when 231,850 tons were exported. In recent years exports have been negligible.

The two largest plants in Switzerland are those of the Jura-Zement Fabrik Aarau, with plant at Wildegg, and the Zementfabrik Holderbank-Wildegg in Holderbank, both in the canton of Aarau. These operations together produce about one-third of all the cement made in Switzerland. The next-largest plant, that of Portland Zementfabrik Laufen, produces about 10 percent of the total. One of the largest plants in the French part of Switzerland is operated at Lausanne by the Societe des Ciments de la Suisse Romande which has six plants with a combined capacity of 200,000 tons annually.

Group Holderbank Of the 15 plants in Switzerland three are associated with nine others in various parts of the world to make up the Group Holderbank, which has a Technical Bureau at the Wildegg plant with a staff of 65 engineers, chemists and other specialists. This bureau provides for its group specialized aid in all phases of cement manufacture, research, testing, etc., and also provides technical advisory information for other operators.

Cementfabrik Holderbank-Wildegg A. G.—The Holderbank plant at Wildegg was built in 1913 with two wet-process kilns having a combined output of 165 tons daily. These kilns have since been lengthened to 262 ft., and they now produce about 350 tons daily. Many other improvements have been made through the years to keep this plant abreast of modern practice. Many interesting and efficient units of equipment have been developed by the bureau for this and other plants under its jurisdiction. At Wildegg there are electric filters for the kiln exhaust gases.

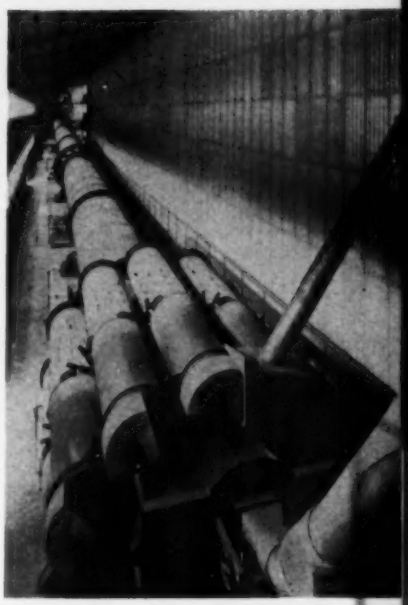
Fabriques de Ciment et de Chaux R. Vigier S. A. The Cement & Lime Works R. Vigier Ltd., at Reuchenette, Switzerland, has been

kept up-to-date by a series of improvements in all departments. The Lepol kiln has been operated since 1933 but was supplemented in 1949 with two high-efficiency vertical kilns with capacities of 120 metric tons daily each. These brought the daily capacity of the plant up to 460 tons. The new vertical kilns are fed with nodulized raw material containing 13 percent moisture, coal being added and mixed before nodulizing. These kilns are fully mechanized. Electric-filters are used to collect the stack gases.

This program also included the installation of a new raw grinding mill made by Escher-Wyss of Zurich. The mill is operated in closed circuit, drying and grinding the material at the rate of 30 t.p.h. The two existing finish-grinding mills installed in 1932 are being connected in closed circuit with a new 16-ft. Sturtevant separator. The finished cement is carried to storage by a Fuller-Kinyon pumping system. New silos with a capacity of 8,000 tons are under construction.

The three vertical kilns for hydraulic lime production have a total capacity of 120 tons daily. This part of the operation has also been modernized, with a resultant reduction in the manpower requirements. Dust collectors installed in this plant have resulted in good working conditions throughout the entire operation.

Portland-Zement Fabrik Laufen The plant of Portland - Zement Fabrik Laufen, at Liesberg, Canton Bern, is said to be one of the most modern operations in that country as the result of an extensive improvement program. The original shaft kiln plant was built in 1886 and was operated until 1936. In that year a new wet-process rotary kiln plant was built at Liesberg which had a capacity of 90,000 metric tons of clinker per year. It produced only clinker, however, and this was shipped by rail to two other plants operated by the company to be ground, packed, and shipped. These plants had the economic advantage of water power. In 1949 construction was begun on a grinding, storage, and packing addition at Liesberg which has just gone into operation.

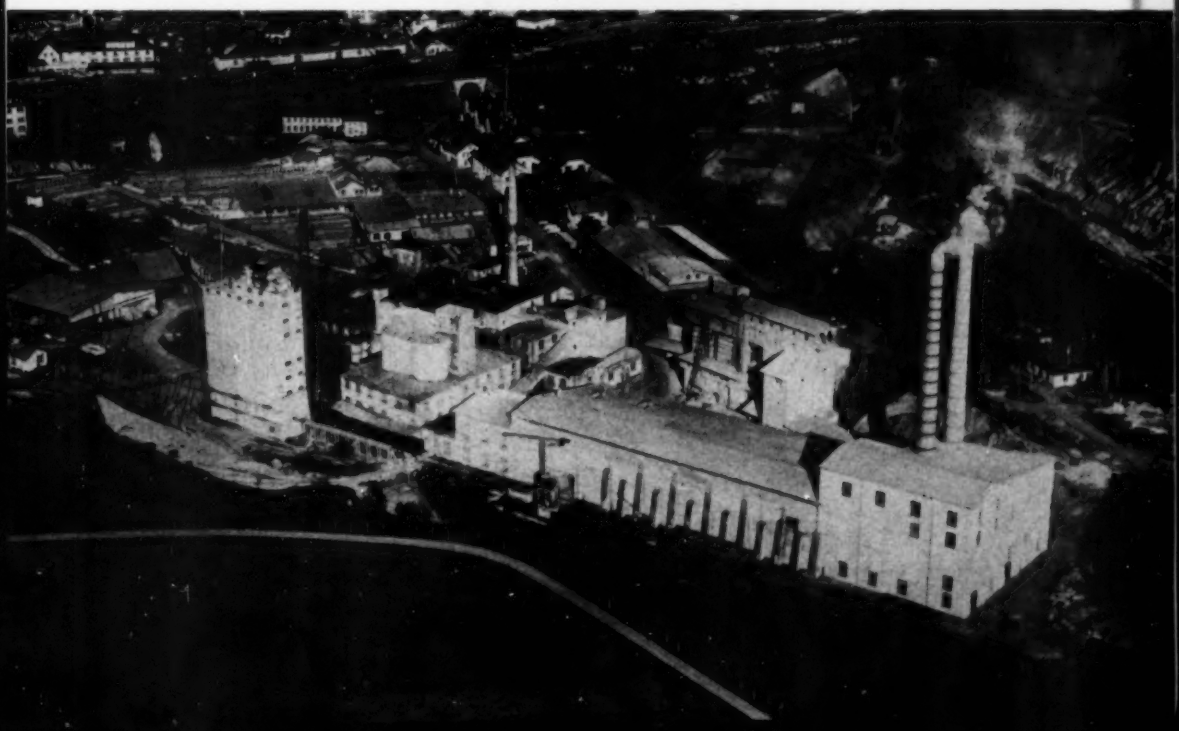


The rotary kiln in the plant of Portland-Zementfabrik Laufen at Liesberg, Switzerland.

Opposite page: An aerial view of the plant of Fabriques de Ciment et de Chaux R. Vigier, S. A., at Reuchenette, Switzerland.

The plant of Hunziker & Company, Ltd., near Olten, Switzerland, seen from the air.

New plants and important expansions are widespread as demand in many countries exceeds capacity



The rotary kilns with integral coolers in the Hunziker plant, Olten, Switzerland.

The raw materials used are limestone and plastic clay of 98 and 35 percent $CaCO_3$ content respectively. Crushing of the limestone is done with a Titan hammermill, and it is carried to plant storage on a belt conveyor. The clay pit is on a hill about 2 km. from, and 100 m. higher than, the plant. The clay is dredged, converted into a slip at the pit by the addition of 60 percent water, and pumped to the plant through a pipeline. There the slurry and the limestone are ground in a Unidan mill into raw slurry with a 35-percent moisture content which is stored in multiple silos. The laboratory-controlled blending of the raw mix is done in these silos.

The rotary kiln is 96 m. long, and the clinker is stored in a roofed building served by a 7-ton overhead traveling crane. The limestone and coal are also stored there. The clinker and gypsum are rehandled by the crane into bins feeding the new clinker mill. This was said to be the first mill in the country operating in closed circuit with a Sturtevant separator. The finished cement is pumped by a pneumatic Cera pump to the four new 1,300-cu. m. storage silos. Porous slab bases under the silos permit air mixing or fluidization of the stored cement. The aerated cement is conveyed from the silos via a 50-m. aerated conveyor with a slope of 5 percent. The packer building is arranged for loading trucks on one side and railroad cars on the other.

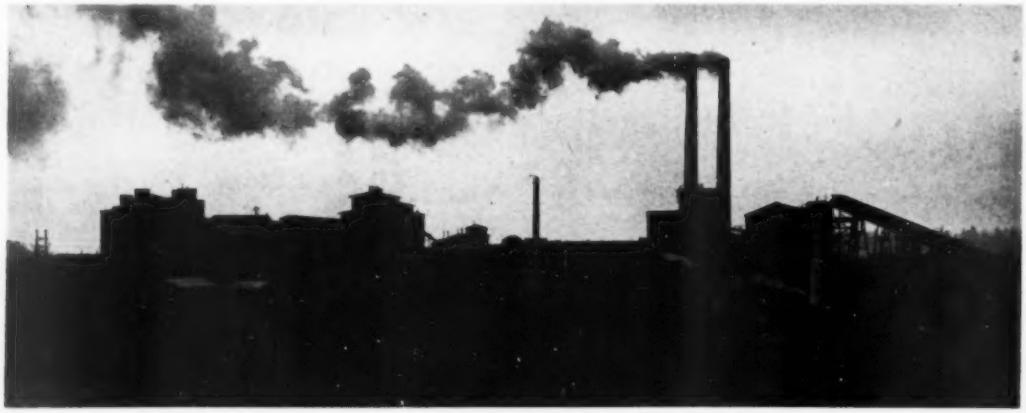
Hunziker & Co., Ltd. Hunziker & Co., Ltd., Zurich, has for 75 years manufactured building material in various plants located in central and eastern Switzerland. At the present time, it operates, besides a cement mill, six other plants producing many kinds of building material, such as vibrospun pipe, made according to their own process ("Superbeton Pipe"); sewer pipe; sand-lime brick, including special sand-lime bricks withstanding high compression for tunnel linings; clay and tile products. It also operates a lime plant and extensive gravel pits.

The cement mill mentioned above, operated as the Portland Cement Works, Ltd., was built in 1929 in one of the suburbs of the city of Olten, at the base of the Jura mountains. The plant is near the necessary raw materials, as well as close to the railroad and the main highway.

The raw material for the cement mill is mined mechanically partly in an open quarry and partly under ground and is transported to the plant by overhead cable railway. The plant is operated by the wet method. The raw material is treated first with a preliminary crusher and then passed through two wet mills (total output 2,300 cu. ft.) The slurry is fed by special pumps to eight concrete silos with a total capacity of 2,200 metric tons. Mixing is done by compressed air.

The rotary kilns were built by F. L. Smidth & Co., Copenhagen, and had a total capacity of 250 metric tons per 24 hours. Some years ago the output was stepped up to 380 metric tons per 24 hours by adding two calcinators, operated by the exhaust gases of the kilns. At the present time the temperature of the exhaust gases in the flue is about 220 deg. F. As a side effect of the calcinators is the development of dust, it was necessary to make use of two electric filters. Although of different make (system Lurgi and system Oski), these filters work on approximately the same principle and with the same high efficiency.

The coal is delivered by railroad, stored in the open and handled by steam shovel. It is dried in a rotary



A view of the plant of Aktiebolaget Gullhogens Bruek at Skovde, Sweden.

drum working with counterdraft and milled in a ball mill. The pulverized coal is stored in a concrete silo and fed from there to the kiln, together with the primary combustion air.

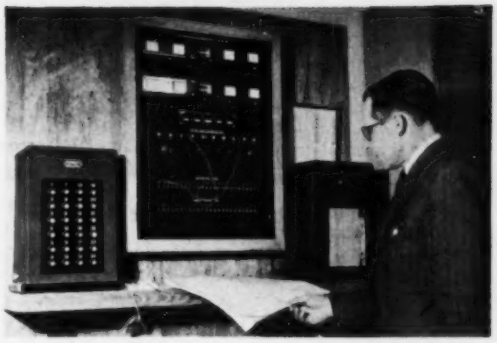
A covered shed with a capacity of 15,000 metric tons provides ample storage facilities for the cement clinker, which is handled by two electric overhead cranes. The clinker is milled in two ball mills, each with a capacity of about 20 metric t.p.h. and stored in four silos. It is then drawn off simultaneously from two or more silos, mixed, and packed in units of 50 kg.

ITALY

In Italy, where natural cements have always been popular, there is reported to be a sharp swing toward artificial or portland cement. Suitable surface limestone deposits for natural cement have been nearly worked out in some areas of northern Italy, and expensive mining methods are coming into use. The cost of wooden mine timbers alone is said to be so high as to make competition with portland cement almost impossible.

No recent figures are available on the number and capacity of cement plants in Italy. In July 1945, when the Allied Commission transferred control of cement plants to the Italian Government, there were 15 plants in operation, with an output of about 50,000 metric tons per month.

Italcementi Company The Italcementi Company, largest cement producer in Italy, with 22 plants, has about 7,000 employees and an annual production of about 24,000,000 bbls. An important expansion program is now in progress.

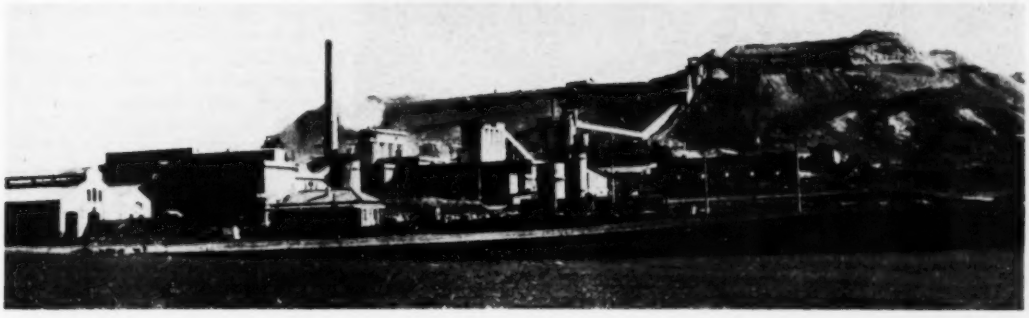


Hj. Glise, chief engineer at the Aktiebolaget Gullhogens Bruek plant, with the Centralograph, which records and checks all steps of the manufacturing process.

Trento Plant—The Kennedy-Van Saun Manufacturing and Engineering Corporation has supplied a large amount of equipment for the company's Trento plant. A complete new crushing plant is being built which includes a 42-in. by 14-ft. heavy-duty feeder, a No. 30 gearless gyratory primary crusher with a built-in synchronous motor, a No. 49½ Type S secondary crusher, and a 5- by 12-ft. vibrating screen, all of Kennedy manufacture. Raw material for the kiln will be dried and ground simultaneously in an 8- by 20-ft. Kennedy air-swept tube mill having an integral gear drive and equipped with a radial flow classifier. The 9½- by 11- by 340-ft. Kennedy rotary kiln is mounted on five supports. It is equipped with an air-quenching cooler and a heat recuperator. This kiln has a rated capacity of 300 metric tons (1,800 bbls.) per day and will be fired with pulverized coal. The fuel consumption is expected to be about 1,100 calories per kg. or 740,000 B.t.u.'s per bbl.

Calusco Plant—For Italcementi's Calusco plant Kennedy-Van Saun has shipped two entire crushing

The pipeline which carries water for hydraulic power for Asland's Pobla plant.



The Villaluenga (Spain) plant of the Cia. Generale de Asfaltos y Portland Asland.

plants comprising two heavy-duty 42-in. by 14-ft. feeders, two No. 30 gearless gyratory primary crushers, three No. 49½ Type S secondary crushers, and three 5- by 12-ft. vibrating screens, and a 10- by 22-ft. Kennedy integral-gear-drive air-swept tube mill for clinker grinding. This mill is equipped with Kennedy radial-flow classifiers for grinding cement to a specific surface area of 1,500 sq. cm. per gm.

S. A. Centrale Cimenterie Italiane (S.A.C.C.I.) For this company Kennedy-Van Saun has supplied an 8- by 14-ft. integral-gear-drive air-swept tube mill and auxiliary equipment including radial-flow classifiers, cyclones and air filters for simultaneously grinding and drying raw material for kiln feed. A Kennedy No. 4 pneumatic transport system will transfer raw material to the silos. An 8- by 20-ft. Kennedy integral-gear-drive air-swept tube mill will operate in conjunction with a separator for grinding clinker and gypsum, and a No. 4 pneumatic transport system will transfer the cement to storage silos.

Calci E Cementi de Segni Practically a complete new cement plant is being supplied to this company by Kennedy-Van Saun. The crushing plant consists of a 40-in. by 60-ft. steel inclined apron conveyor, a 42- by 48-in. heavy-duty Type E hammer-mill and a 7- by 70-ft. rotary drier equipped with disc feeders, cyclone collector, exhauster, and furnace, arranged so as to utilize waste kiln gas. An 8- by 14-ft. 3-compartment Kennedy air-swept tube mill will dry and grind raw material for kiln feed. This mill is equipped with radial-flow classifiers, collectors, and air filters.

The new Kennedy 9-ft. 8-in. by 8- by 9- by 230-ft. dry process rotary kiln has a rated capacity of 200 metric tons per day and will be equipped with a heat recuperator. The 7-ft. 5-in. by 85-ft. rotary cooler will be equipped with a special heat recuperator, and the centralized kiln control panel will have instruments for complete control of temperature, drafts, and kiln and feeder speeds. Low-grade coal for firing the kiln will be ground in a 6- by 8-ft. Kennedy air-swept tube mill with integral gear drive.

In the clinker-grinding department a 7- by 40-ft., 3-compartment Kennedy tube mill will operate in open circuit. A similar 8- by 28-ft. tube mill will operate in closed circuit with an air classifier. These mills will be equipped with feeders and air filters. Two Kennedy No. 4 automatic pneumatic cement transport systems will deliver the cement to silos.

A typical foreman's house near Asland's Moncada plant.

The primary school for children of workers at Asland's Moncada plant.

FRANCE

The production of portland cement in France increased in 1949, and further increases are expected in 1950. At the end of 1947 the cement industry was still in bad shape, with only about 60 percent of pre-war capacity available. About 30 plants were in operation; ten others were shut down, awaiting repairs and new equipment. The output of portland cement was increased in 1949 at two plants near Bordeaux, "La Souys" and "Espiet." Further increases are expected in 1950.

No detailed information is available on the progress that has been made generally in France in the reconstruction and rehabilitation of its cement plants. Cement output before the war averaged about 4,000,000 metric tons annually. At the end of the war about two-thirds of the plants were in condition to resume operation at about 75 percent of their pre-war capacity. A program was immediately put into effect to replace worn-out machinery as quickly as possible. Orders were placed in the United States for 4 rotary kilns with Fuller coolers, 12 tube mills, crushers, hammermills, packers, 12 power shovels, 40 Easton cars, compressors, and other units. Some orders were also placed in England. A second order was later placed for about the same amount of equipment.

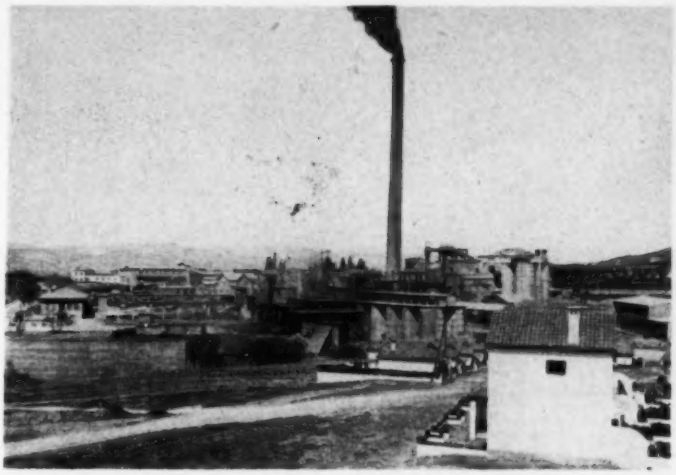
One new plant with a capacity of 685 metric tons daily was built dur-

ing the war. In 1948 Poliet & Chausson added a 400-ton kiln to its existing 685-ton plant. Ciments Francois was reported to be building a plant at Colombelles, on the Normandy coast, to replace a war-wrecked plant. La Farge was also reported to be building a new plant to replace an old one at Sangatte, and others are said to be adding new kilns and making other improvements.

Lafarge S. A. des Chaux & Ciments Lafarge & du Teil, Paris, France, is the largest producer of cement in France and its colonies, operating 11 plants in France alone. Only one of its plants, that at Calais, was damaged during the war, and this has been rebuilt. It originally had two 150-ton kilns; and a new 400-ton kiln, tube mills and other equipment were bought in the United States. The plant went back into operation in 1947.

Haut Rhin S. A. des Chaux & Ciments Portland du Haut Rhin operates a plant at Altkirch in the Province of Haut Rhin, 18 km. south of Mulhouse. This plant went into operation in 1927 and is a wet-process operation, with two kilns 74 m. long each having a capacity of 180 tons daily. Most of the equipment was supplied by F. L. Smidth & Co.

Societe des Ciments Francais The only French plant completely destroyed during World War II was that of Cimenterie de Colombelles, a subsidiary of the Societe des Ciments Francais, located near Caen, France. This plant uses slag as the principal raw material. Reconstruction of this 2-kiln plant was begun in 1945, using mostly new machinery from the United States. The result is practically a new plant. Equipment for the first stage included a new 400-ton kiln, a Fuller cooler, three tube mills, and a new packing plant. A second stage of replacement is said to be under way.



A general view of the plant of La Auxiliar de la Construccion, S. A., near Barcelona, Spain.

The plant of Cementos Molins, S. A., Castro Caminos, province of Barcelona, Spain.

The plant of Ciments et Chaux de Montebourg, half way between Valaques and Cherbourg, also a subsidiary of Francais, was badly damaged. Rebuilding was started at the end of the war, using French equipment and some from other plants of the Societe. Production was begun on a small scale in 1946. Equipment shipped from the United States included a kiln, a cooler, and some tube mills. The original plant had two 200-ton-per-day rotary cement kilns and 10 shaft kilns for lime.

LUXEMBURG, ALSACE-LORRAINE

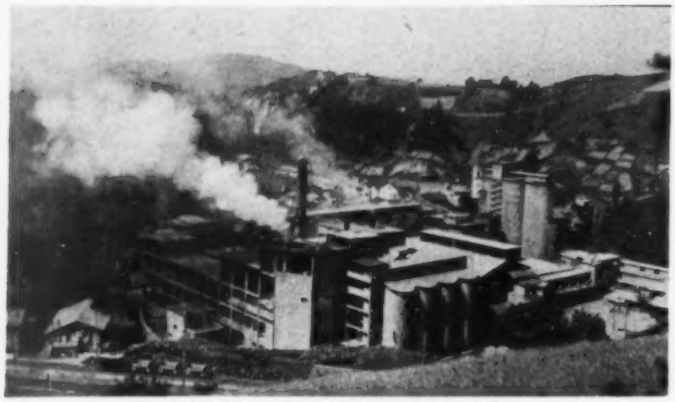
No recent figures are available on the cement industry in Luxemburg and Alsace-Lorraine. The latest are for 1943, when these countries were parts of Greater Germany. At that time there were six plants, with a combined annual capacity of 1,000,000 metric tons.

NETHERLANDS

Early in 1948 the N. V. Eerste Nederlandsche Cement Industrie at Maastricht began an expansion program to increase the capacity of its 400,000-ton plant by about 200,000 tons. This, with the 150,000 tons of cement produced by the blast furnaces at Ijuiden, was still far short of needs; and large quantities must still be imported. The program at this plant included a new 394-ft. Allis-Chalmers rotary kiln.

SWEDEN

The output of the cement industry in Sweden has increased steadily from a low of 645,023 metric tons in 1941 to 1,600,000 tons in 1948 and has converted it from an im-



The plant of Cementos Rezola, S. A., at San Sebastian, Spain.

porter to an exporter of this commodity. The 1949 production was increased to about 2,000,000 tons, due to the completion of a new 320,000-ton plant near Stockholm by Skanska Cement, A. B., and the 160,000-ton increase in capacity of its plant at Koping. Most of the equipment for the Vika plant was supplied by F. L. Smidth, including two Unax kilns. A new plant was also reported to have been built by Cementa, Svenska Cementforsaljnings, A. B.

The entire cement industry in Sweden benefits from the activities of the Cement & Concrete Research Institute which was established by the industry for the scientific study of the problems of materials and methods.

Slite Cement and Kalk, A.B. Early in 1950 it was reported that the Slite Cement and Kalk A.B. was expanding its annual capacity to 300,000 metric tons. Most of the production was expected to be exported outside of Europe.

Aktiebolaget Gullhogens Bruek The Aktiebolaget Gullhogens Bruek of Stockholm started operations in 1916 with a lime plant at Skovde. In 1924 two shaft kilns were installed for the manufacture of cement, and a third kiln was installed in 1926. All were of German manufacture. In 1934 a 220-ton F. L. Smidth rotary kiln was installed, and a second larger kiln was added in 1939. Recent improvements have further increased the capacity of this plant, which now produces 550 metric tons per day from the rotary kilns and 150 tons from the two shaft kilns which are still in use.

The plant is at the edge of the limestone quarry, where 15-ton Euclid trucks are used for haulage. Hammermills are used to reduce the stone.

The company maintains a modern 2-story laboratory where the usual control tests are made and research is carried on.

A feature of this plant is the Centralograph apparatus which records and checks all steps of cement manufacture. This is located in the chief engineer's office and makes it possible for him to see at any moment what is going on in the plant. It indicates the activities of the crushers, the raw mills, rotary kilns, coal mills, clinker mills, packers, conveyors, and the old shaft kiln plant. The continuous record shows when the kilns are slowed down or speeded up, vertical dashes instead of solid lines being used so that counts can be made and any variations in speed readily recognized. The temperatures in consecutive sequents of the kiln are indicated and recorded. The number of bags loaded into railroad cars is automatically recorded on another panel. Lights indicate at all times which machines are in operation. The apparatus is also said to be helpful in its effect on the workers.

DENMARK

The production of cement in Denmark reached about 900,000 metric tons in 1949, 7 percent more than in 1948.

FINLAND

The firm of Pargas Kalkbergs Aktiebolag is the largest producer of cement in Finland, producing about half that country's annual output of 500,000 metric tons. It is reported that a fourth kiln is soon to be installed in its plant. It is interesting to note that the coal used in this plant comes from the United Kingdom and Poland, and the gypsum from Cyprus and French North Africa. The company also operates a lime plant with a capacity of 60,000 tons annually.

NORWAY

As in a number of other European countries, the cement industry in Norway has been torn between the vital need for cement for reconstruction and the need for foreign exchange through exports. That domestic needs have prevailed is evident from the fact that in 1948, when 526,187 metric tons of cement were produced, only 21,562 tons were exported. Cement rationing ended on April 12, 1949. During 1948 improvements were made to all three Norwegian cement plants, and some work is still under way.

Christiana Portland Cementfabrik Portland cement was first manufactured in Norway by the Christiana Portland Cementfabrik in 1892, when it built its original plant alongside the Oslo Fjord, about 20 miles from Oslo. This was a dry-process plant with a capacity of 60,000 bbls. annually. Bottle or dome kilns were originally used, but were replaced by shaft kilns, which were in turn replaced by rotary kilns. It is now a wet-process plant with a capacity of 1,500,000 bbls. per year. There are three Smidth Unax kilns, the largest 11- by 360-ft., with a capacity of 2,100 bbls. per day. A water-reducing agent developed by the company is added at the raw mills. This has reduced the slurry water content from 33 to about 26 percent, improving the fuel economy of the kiln from 10 to 15 percent. This material also acts as a grinding aid. In addition to the above kiln, equipment added in the last two years includes an unloading crane for coal, gypsum and rock, which are received by sea; a Symons 7-ft. shorthead cone crusher; two 8½- by 36-ft. 3-compartment raw mills; three 8½- by 36-ft. 3-compartment finish mills; a 100- by 600-ft. rock and clinker storage building and a 113-ft.-dia. by 20-ft.-high slurry tank for kiln feed. The kiln is equipped with an air-quenching clinker cooler of a new design. Most of the equipment was furnished by F. L. Smidth & Co.

Dalen Portland Cementfabrik The other large cement plant in Norway is that of the Dalen Portland Cementfabrik, which is located on the southeast coast, about 100 miles from Oslo. This plant was built during World War I and started operating when the war was over. It is a dry-process operation. At the end of World War II it had a capacity of 1,500,000 bbls. per year. Shortly after the war a Lepol kiln with a capacity of 3,000 bbls. per day was installed. This has a fuel ratio of 650,000 B.t.u.'s per bbl. The plant has an interesting layout, with the crushing and grinding departments located on a hill between the quarry and the kiln departments below, making gravity flow of materials possible.

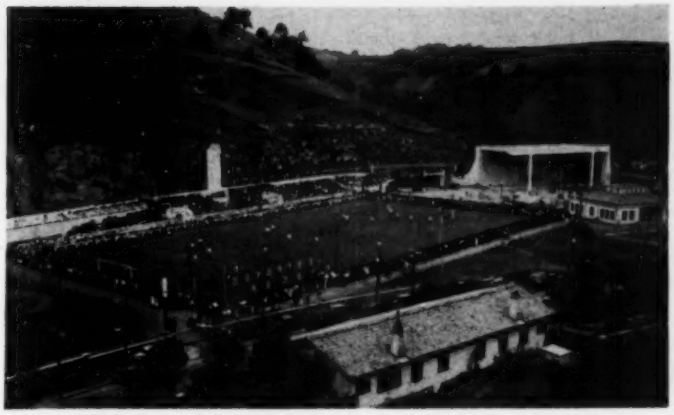
Recently added to this plant were a Symons 7-ft. short-head cone crusher; and 8½- by 36-ft. 3-compartment raw mill; two 16-ft. Sturtevant separators for the raw mills; a 320- by 130-ft. 60,000-ton capacity clinker storage with two 10-ton overhead cranes; a new finish-grinding department with three 3-compartment 8½- by 36-ft. mills with Pendan feeders and electric dust collectors. Plans are being considered for the bulk shipment of cement to packing plants in principal cities.

Nordland Portland Cementfabrik The third plant in Norway is the Nordland Portland Cementfabrik which is located north of the Arctic Circle. It started operation a few years after the end of World War I. Nordland is a wet-process operation, with a capacity of 300,000 bbls. per year.

SPAIN

The latest report from Spain is that the production in 1947 was 1,920,566 metric tons of portland cement and 265,774 tons of natural cement. The total output of both natural and artificial cements in 1948 was 2,330,850 tons. Production in 1947 was from 34 portland cement and 99 natural cement plants. The capacity of the industry in 1946 was reported to be 2,750,000 tons, from 51 rotary and 25 vertical kilns, and it has probably changed little.

Guadalquivir Hydrographic Commission It was announced early in 1948 that a new portland cement plant would be built at Villaneuva del Rio, Seville Province, by the Guadalquivir Hydrographic Commission. Capacity was to be 50,000 metric tons annually. The plant was to be government property under the supervision of the Ministry of Public Works and was to be directly under the control of the Commission. The cement produced is to be used exclusively for hydrographic projects throughout southwestern Spain.



A modern athletic field and other recreational facilities have been provided for employees of Cementos Rezola.

Cementos Molins, S.A. One of the most interesting operations in Spain, or for that matter in Europe, is that of Cementos Molins, S.A., at Cuatro Caminos in the Province of Barcelona. This operation dates back to the last century, when Juan Molins began to produce natural cement and lime. Cementos Molins, S.A., was formed in 1928, when a plant was built there for the manufacture of aluminous cement under the patents of S.A. des Chaux et Ciments de Lefarge et du Teil. It is still the only manufacturer of this type of cement in Spain. In 1932 an addition to the plant was built for the manufacture of portland cement. Natural cement is also produced at the company's quarry at Paleja. The portland cement is manufactured by the dry process, using limestone and clay raw materials.

Probably of most interest to our readers is the production of aluminous cement at this plant. Features of this cement are its high strength at 24 hrs. (said to be superior to that of portland cement in 28 days), its high resistance to many chemicals, and its refractory properties, which enable it to resist temperatures up to 1,250 deg. C. when used in concrete with other suitable ingredients.

The chief raw materials used in the manufacture of this cement are limestone and bauxite. The former has a 98-percent calcium carbonate content. The bauxite was originally imported from France, but during the war lower-grade Spanish bauxites were tried, with poor success. A mixture of the two is now used. The powdered bauxite is mixed with 30- to 70-mm. stone with aluminous cement for binder, and briquettes are formed in Komarek-Greaves (Chicago) pressers. The fuel used is bituminous coal with 30-32 percent volatile matter, 79 percent ash, and 7,000-7,500 calories per kg. The two vertical reverberator-furnaces are pulverized-coal fired and the raw materials are heated to fusion. The processing preceding and following the kilns is similar to those of other cement operations.

La Auxiliar de la Construccion, S. A. The plant of La Auxiliar de la Construccion, S.A., which has a capacity of 120,000 metric tons annually (1,800 bbls. daily), is located on the Madrid-Barcelona highway, about 5 miles from the latter city. It is connected by two miles of private railroad with the Spanish railway system. The quarry supplies the plant with about 700 tons of stone daily. Loading is done with shovels, and cars carry the stone by gravity down a 4 percent incline to the crushing plant, a counterpoise system returning the empty cars. The stone is reduced by a jaw crusher and a hammermill and is then carried on a belt conveyor to separate storages for

three different grades. A cableway system 2 miles long carries these materials to the cement plant.

At the plant the stone is passed through two 50-ft. rotary driers, from which it goes into 12 storage silos. Feeders supply the various types of stone as desired to weighing equipment ahead of the raw mills. The 7- by 28-ft. raw mills are driven by 400-hp. synchronous motors and have a capacity of 12 t.p.h. each, grinding to 92 percent through 200-mesh. The finished raw material goes to six silos with a total capacity of 4,000 tons. Air through porous plates in the bottoms of these silos is used to blend the material thoroughly.

One of the two kilns is a rotary 48 meters long and 9 feet in diameter. The other is a Lepol kiln with a 9- by 85-ft. rotary section and a 33-ft. grate section. Together they produce 350 tons of clinker daily. The clinker goes to a 7,000-ton open storage. Three 6- by 28-ft. mills are used for grinding clinker and gypsum. Each has a capacity of 360 tons daily and each is driven by a 350-hp. motor. The cement is stored in 16 silos holding 400 tons each. St. Regis packers are used to load the 50-kg. (112-lb.) sacks commonly used in Spain.

Cementos Rezola, S.A. Cementos Rezola, S.A., San Sebastian, Spain, is observing its 50th anniversary in 1950. This event is to be celebrated with festivities of various kinds. The company has already published an illustrated souvenir booklet commemorating the occasion which contains a history of the company, together with information on its development and progress and a description of its plant. The plant has been kept up-to-date throughout the years; two 30-t.p.h. raw mills are now being installed.

The plant is a dry-process operation with a 200,000-ton-per-year capacity. It is located about 3 miles from San Sebastian on the main road to Madrid and on the railway to Bilbao. The raw materials are marl and limestone hauled by an electric railway. Crushing is done in three Titan crushers followed by a Symons secondary unit. Raw grinding is done by two 2.10- by 11.0-m. Unidan mills, two 1.80- by 11.0-m. compound mills, and two 1.80- by 8.0-m. compound mills. The first four mills are also used for clinker grinding.

A Fuller-Kinyon pumping system is used for transporting and blending the raw material. There are two 240-ton-per-day Lepol kilns and three Andreas automatic shaft kilns with capacities of 100 tons per day each. The storage has capacity for 8,600 tons of raw material, 15,000 tons of clinker and 8,000 tons of coal. Three Haver packers are used, and there is an SPIG electrical precipitator. The company has two steamers, of 600- and 1,000-ton capacity, respectively, which are used for the shipment of cement from the ports of San Sebastian and Pasajes and for the receipt of Austrian coal.

The company has gone to great lengths to insure the comfort, health, and happiness of its employees. It provides health, accident, and retirement programs beyond those of the government; medical service; cooperatives stores; playgrounds, and a recreational center. Most of the employees live in three groups of homes near the plant.

Compania General de Asfaltos y Portland Asland The largest producer of portland cement in Spain is the Cia. General de Asfaltos y Portland Asland, with offices in Barcelona. It operates six plants strategically located throughout the country. These produce nearly 500,000 metric tons of cement annually, about 25 percent of the total production of Spain. Four of these plants are permanent operations; the other two are "portable" plants erected at the sites of two large dams under construction. They are located at Benageber in Valencia and Oliana in Lerida; and their capacities, respectively, are 30,000 and 40,000 tons annually. The first-mentioned plant has a 2- by 46-m. Krupp kiln and the other a 9- by 140-ft. Allis-Chalmers kiln. They will be dismantled after the dams are completed.

The Asland company was founded in 1901, when it built the second rotary kiln plant to go into operation in Spain.

Cordoba plant — The company's newest plant is located at Cordoba, in the southern part of the country. Designed by Polysius, this plant went into operation in 1931 with a capacity of 80,000 tons annually. A second kiln from a dismantled plant in the north (Bilbao) is to be installed this year and will increase its capacity to 115,000 tons. The original kiln in this plant is a Lepol unit with a 3.30- by 32-m. rotary section. Bates packers are used.

Pobla plant — The company's first plant was built at Pobla de Lillet in the Pyrenees Mountains near the French border. Originally it had three 6- by 60-ft. Allis-Chalmers rotary kilns and received its power from a 3-mile hydraulic pipe line with a head of 1,000 ft. In 1909 and 1911 the plant was enlarged by the addition of two 8- by 120-ft. rotary kilns, and Babcock & Wilcox waste-heat boilers were installed. Now only the two largest kilns are used for regular cement and one of the older ones for white cement, which has been produced since 1922. The plant's capacity is now 80,000 tons annually.

Moncada plant—The second mill built by Asland was at Moncada, 8 miles from Barcelona, the most important commercial harbor of Spain. When it was built in 1916, it had two 9- by 140-ft. Allis-Chalmers rotary kilns and a capacity of 300 tons daily. In 1923 a 10- by 165-ft. kiln was added which gave the plant a daily capacity of 550,000 metric tons. In 1942, after the Spanish Civil War, a 250-ton Lepol kiln was installed and one of the original kilns was removed for use in a temporary plant to be set up near the site of a large dam. By 1935 the entire plant had been converted for the simultaneous manufacture of cement and pig iron by the Basset process. After the war, however, it had to be reconverted because of changing conditions. It now has a capacity of 650 tons daily or about 150,000 tons annually. Because of the shortage of power in Spain, a waste-head power plant is now being installed.

Villaluenga plant—The company's third plant, at Villaluenga, 25 miles from Madrid and 10 miles from Toledo, was built in 1926. Originally it had a 10- by 165-ft. Allis-Chalmers kiln, and a second similar unit was added in 1929, increasing the capacity to 150,000 tons annually. Both have waste-heat boilers. Raymond direct-firing coal mills are used.

Bilbao plant — In 1928 Asland bought a plant at Bilbao which had a capacity of 40,000 tons annually. This has recently been dismantled.

Sociedad Financiera y Minera The Sociedad Financiera y Minera operates a dry-process plant near the city of Malaga. When it was built, it had four Pfeiffer-Thiele automatic shaft kilns with a capacity of 114,-

000 metric tons annually. These kilns were replaced in 1947 with a 75,000-ton capacity Lepol kiln.

PORTUGAL

No recent figures are available on the cement industry in Portugal, but at the end of 1945 there were three plants in operation which produced 262,980 metric tons in that year. A new 200-ton-per-day plant was also planned by the Cia. de Carvoes e Cementos de Cabo Mondego. Equipment was to be purchased in the United States.

Cia. de Cementos Brancos-Zibra Portugal's first white cement plant, that of Cia. de Cementos Brancos-Zibra, was opened officially on February 5, 1950. It is located at Pataias, Alcobaca district, in west-central Portugal. Its normal productive capacity is 40,000 metric tons annually, far in excess of the needs of the country, and the excess will be marketed in other countries. The raw materials, obtained locally, are limestone, kaolin, and sand.

TURKEY

During World War II the Turkish Government placed two new cement plants in operation, one in Ankara and one in Sivas. In 1944 these two plants and the government-operated plant at Zeytinburnu, produced 190,027 metric tons of cement, about 2/3 of the output of the industry that year. The privately-owned Kartal cement plant at Istanbul produced 92,480 tons. In 1945 output rose to over 300,000 bbls. still short of demands. In that year the Zeytinburnu plant was returned to private ownership after wartime operation. It was planned to increase the capacity of the two state-operated plants.

According to reports received early in 1948, the output of the industry had risen to about 350,000 tons in 1947; but it was expected that at least 60,000 tons would have to be imported in 1948 to meet growing demands. A new plant at Derince went into operation late in 1947. It was expected that this would bring production in 1948 up to about 400,000 metric tons. It is now reported that the capacity of the Sivas plant is to be doubled and that new plants are to be built at Izmir and Zanguldak.

RUSSIA

The last report on the cement industry in Soviet Russia, late in 1947, indicated great activity. According to reports, 34 new 2-kiln plants were ordered soon after the end of the war, 15 from Polysius and 19 from Krupp, and all of the equipment had already been delivered. The Russians are reported operating both companies, replacing the German workers with Russians as rapidly as possible.

Little is known about the status of the industry in recent years. In 1929 production was in excess of 13,000,000 bbls. During the first Five Year Plan 19 of the 31 existing plants were modernized, increasing capacity to 19,000,000 bbls. From then until 1939 it is reported that 16 new plants were built, increasing the capacity to over 36,000,000 bbls. Additional plants were built from then until 1947, but no information on these is available. It seems probable that there are now about 80 cement plants in Russia.

POLAND

It was reported late in 1949 that a new cement plant is being built in Wierzbica, Poland, which will be one of the largest in that country. It was stated that machinery and factory equipment were arriving from the Soviet Union on the basis of barter and trade between the two countries.

Earlier it was reported that F. L. Smidth & Co., Copenhagen, Denmark, had received an order for cement mill machinery for cement plants in Poland.

Late in 1948 it was reported that a new 350,000-metric-ton plant was to be built at Strzelce, near Opole, also with Soviet equipment.

RUMANIA

No recent information has been received on the status of the cement industry in Rumania. Cement output in 1947 totaled 418,044 metric tons as compared with 226,193 tons in 1945 and 474,191 in 1938. The potential output of the industry is estimated at about 550,000 metric tons. Production in 1947 was only 126 tons per employee per year.

(To be continued in later issues)

Fuel Efficiency

(From page 65)

on stone of this size for the last ten months. Operation has been virtually trouble-free and the quality of lime produced has been excellent.

Results of Experiment The objectives of the experiment have been achieved to the satisfaction of all concerned. In the first place, the use of plus 4-in. stone has eliminated the necessity for hand picking and has reduced the percentage of quarry output which must be processed to raw stone products. In the second place, both the fuel efficiency and the production rate of the kiln have been greatly increased.

Under natural draft, using hand-selected stone, 6 cords of wood per day were fired to produce 12 tons of lime. In the early phases of the experiment production was maintained at 12 tons per day and only 4 cords of wood were fired. Since that time both firing and drawing rate have been gradually increased until, at the present time, 6 cords of wood and 18 tons of daily production represent standard practice. Some further increase in production may be anticipated but it is felt that the kilns are now operating close to their full capacity.

Conclusion The increase of 50 percent in kiln capacity and of 33 1/3 percent in fuel efficiency indicate the success of the experiment. As a result, the No. 2 kiln has been modified in the same way and was placed in production late in April. Similar modification of the No. 4 kiln will be undertaken in the near future.

In addition to placing the kilns under induced draft, the company has installed a system of apron conveyors to speed up the draw and eliminate the wheelbarrows which were formerly used to transfer lime from the kilns to the crusher.

Many other improvements are contemplated in connection with a long-term program for plant modernization. Some of these are now under way, while others are still in the planning stage.

Michael Brisch, president of the Rockwell Lime Company, has been the moving spirit in the development and implementation of the various phases of plant improvement and modernization. Atherton & Evans of Annville, Pa., are responsible for the detailed design of the various installations, specification of equipment, and plant supervision during experimental and otherwise critical stages in the development of the program.

The first shipment of gypsum rock from the Windermer, British Columbia, mine of Columbia Gypsum Products, Inc., was made to the calcining plant at Spokane, Wash., recently, where it will be converted into soil conditioner and building products.

Report on Current Labor Developments

By S. HERBERT UNTERBERGER
Director of Research
Labor Relations Information Bureau
Washington, D. C.

Building Trades Caught in Crossfire

another Pit and Quarry exclusive

THE building construction industry finds itself the innocent bystander in a battle between the National Labor Relations Board and its independent general counsel, Robert N. Denham.

In the past, Mr. Denham has from time to time suggested that the Board has been circumventing the Taft-Hartley law by many of its decisions. The Board, on the other hand, has made no secret of its general dislike of the institution of the independent general counsel and of Mr. Denham in particular. The Board's chairman, Paul Herzog, and other members have spoken and testified in opposition to that part of the Taft-Hartley act which established the independence of the general counsel.

After failing to repeal the Taft-Hartley law, the President tried to get rid of the independent general counsel by indirect means. Under his powers to reorganize the government, the President proposed that, in the interest of efficient government, the general counsel again be made subordinate to the National Labor Relations Board. This measure might have become effective except for the opposition of Senator Taft, who led the successful fight for Congressional rejection of this reorganization plan.

Failure of this plan, however, did not stop the feud. Now the Board has gone on the offensive by accusing the general counsel of violating the Taft-Hartley Act. They rejected Mr. Denham's proposal to waive the election requirement before a union shop could be authorized for the building trades. Mr. Denham proposed this because the shifting nature of employment in the building trades made it virtually impossible to conduct elections.

The Board, however, stood foursquare on the law. It rejected Mr. Denham's proposal as a violation of the Act. And it took the occasion to dress Mr. Denham down, telling him publicly that if the law was unworkable, it was up to Congress to change it; that neither the Board nor its independent general counsel had that authority.

To some extent, the building trades are caught in the middle. As a practical matter, however, it is unlikely that a case involving this subject will reach the Board. Such cases can get to the Board only if referred to it by Mr. Denham, and he is unlikely to refer them.

A difficulty will arise, of course, if some other industry also requests a similar exemption. Then the general counsel may have to face the prospect of being charged with discriminating in favor of the construction industry; and the feud will take on more violent proportions.

Finally, such a deterioration of the relationship between the Board and its general counsel can do no one any good. Now the building trades are the scapegoat. Next time it may be some other kind of business.

Failure of the Railway Labor Act

Not so long ago the Railway Labor Act was regarded as a model labor law. Responsible public officials, private citizens and members of Congress were recommending that its principles be followed in a general labor law. The events of the last few months bear testimony that that law is far less effective in maintaining labor peace than was believed.

The Railway Labor Act depends primarily on the strategy of delay, popularly known as "cooling-off." It has not one cooling off period, but several. It assumes that somewhere along the line a satisfactory compromise can be worked out, in mediation, or in fact-finding, or on the basis of the fact-finder's recommendations. It preserves the right to strike as a last resort.

For many years the assumption proved to be accurate. No significant railway strike occurred. Then after the war railroad labor troubles began to assume major proportions. In 1950 they have reached a new peak.

This experience should prove very educational to those who are looking for a formula that will solve labor problems. It looked for a long time as if the Railway Labor Act contained that formula. But when the going got rough, the formula didn't work.

There are many reasons why the Railway Labor Act failed. Outstanding among them is the economics of the situation. When the Railway Labor Act was passed, and for many years thereafter, railroad workers, particularly in the train and engine service, were among labor's aristocrats. They were relatively well paid and (at least the senior workers) quite secure. They could frequently afford to compromise.

The rapid spread of unionization and the rapid rise of wages during the war and post-war years left the railroad workers behind. The rising cost of living began to pinch. Furthermore, electrification and dieselization began to affect the jobs of even the senior workers. The workers believed that they could no longer afford to compromise. Their resistance stiffened. Thus a law which depended on compromise under all circumstances failed.

New Back Pay Rules

When an employer loses a case where he has been charged with discharging an employee illegally, the NLRB generally requires him to reinstate the employee and to give him back pay. In the past the amount of back pay due has been computed by determining the total amount an employee would have earned had he stayed on his job from the time of his discharge to the time the reimbursement is made and subtracting from that the amount he actually earned during that period.

Under this policy, an employee who made more after his illegal discharge than he would have made on the job from which he was discharged would not be entitled to anything. This would be true even if he were unemployed for some length of time after his discharge. But if an employee were unemployed for a whole calendar quarter, he would lose Social Security credit for that quarter.

In a recent case the Board regarded such a loss of Social Security credit as a serious loss. Hence, it promulgated a new policy. Back pay is now calculated separately for each quarter. Earnings in one quarter will not be offset against back pay due for other quarters. This method for calculating back pay may substantially increase the amount an employer is required to pay.

Rock Crushing and Screening Lubrication Features* —Part II

THE GYRATORY

The gyratory also takes quarried rock for direct reduction in size. This machine crushes through the circular rolling motion of the crushing head, which is operated by gearing or belt drive through an eccentric at the bottom of the shaft. During the circular rolling motion of the head it successively approaches every point of the interior of the throat to develop a continuous breaking of the material to be reduced in size.

Typical Features of Design

Group 1.

Crushers having short eccentric operated by bevel gears. Lubrication: bath, splash or circulation oiling.

Group 2.

(a) Crushers having long eccentric operated by bevel gears.

(b) Crushers with short eccentric, driven direct, no gears. Lubrication by circulation oiling.

Group 3.

Crushers with short eccentric driven by bevel gears; short shafts. Heavy-duty oil circulation system.

Design Affects Lubrication of Some Bearings

Lubrication of gear type gyratories with countershafts must be carefully studied, especially when the countershafts are fitted with outboard bearings to steady the shafts and reduce the load on the main bearings.

The Bearing Oil

The grade of oil to use will depend upon the design. A heavy engine or machine oil ranging from 500 to 750 seconds Saybolt Universal viscosity at 100 deg. F. will afford adequate protection on some gyratories. Others require a turbine grade 300 second oil for their circulating systems.

Climatic conditions, of course, must always be considered in selecting the oil. A lower viscosity is generally best in cold weather since the accompanying pour test assures better fluidity under these conditions.

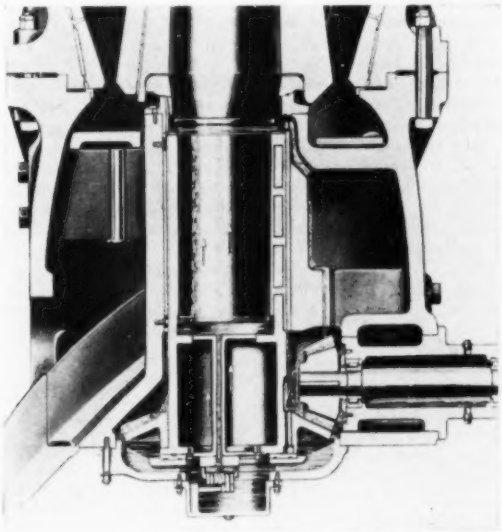
Gear Requirements

Realizing that the gearing in the gear-driven gyratory is subject to severe service, provisions are made to protect gears against contact with abrasive foreign matter. They are housed in oil-tight cases and dust rings are fitted on each shaft where it enters the gear case.

Even so some contamination of the gear lubricant will occur. For this reason, gear lubrication has been carefully studied. The lubricant must not be too thin or too low in viscosity otherwise its protective or cushioning ability may be inadequate to prevent the teeth from actual contact under heavy loads. Too heavy a lubricant, however, would hold grit or dust in suspension and permit it to develop a scoring action on the gear teeth.

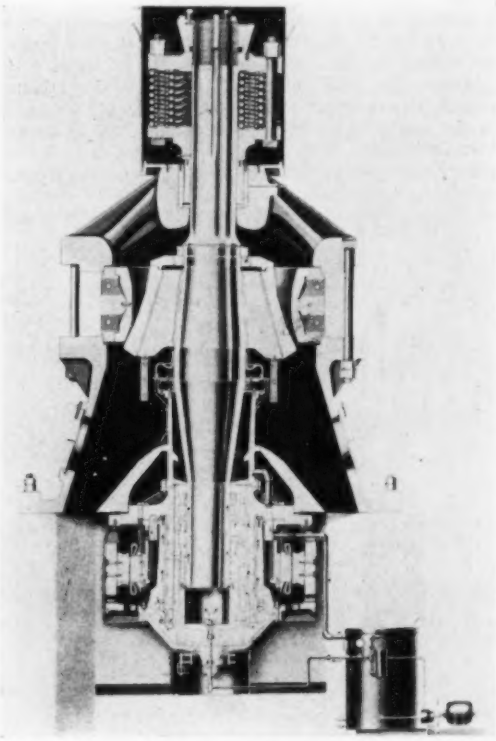
A gear lubricant of from 50 to

*Reprinted from *Lubrication*, October, 1949, by permission of The Texas Company.



Courtesy of Allis-Chalmers Mfg. Co.

Figure 5—Section through a Superior McCully Gyratory Crusher showing internal lubricating system. The reversible oil pump provides the necessary lubrication for the eccentric bearings, gears and brass wearing ring supporting the eccentric.



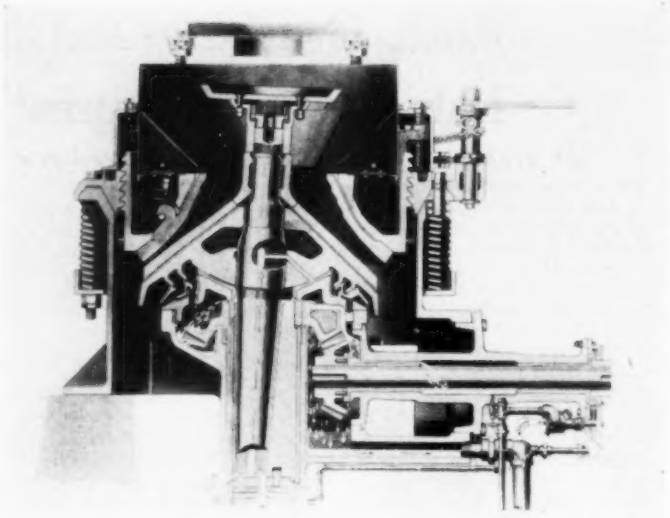
Courtesy of Kennedy-Van Saun Mfg. & Eng. Corp.

Figure 6—The Kennedy roller bearing gearless type "S" low head crusher showing features of the automatic oiling system.

160 seconds Saybolt viscosity at 210 deg. F. having extreme pressure characteristics will usually be most dependable. An oil within this viscosity range (according to the operating temperatures) will resist the drying action of dust and prevent its packing between the teeth of the gears, thus obviating any tendency in the latter to spring and throw any unnecessary pressure on the countershaft bearings or eccentric. In cold weather a gear lubricant just like a bearing oil should have low pour test so that it will flow dependably. Mild extreme pressure characteristics are advisable when such a lubricant is to function under very heavy duty service.

Lubricating the Eccentric

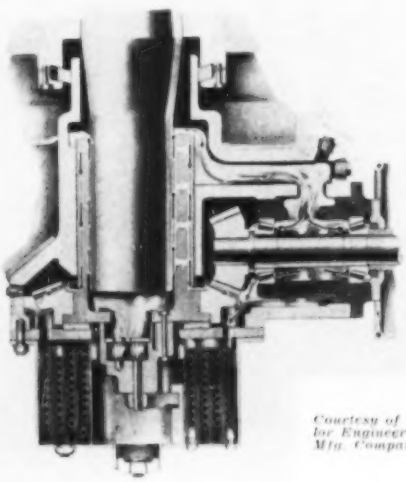
Gyratory motion for the main shaft is developed by the eccentric. This motion must be maintained at a uniform rate so that maximum crushing ability will be developed with minimum power consumption. Lubrication must, therefore, be most carefully studied. As the eccentric revolves in a bushing and around a shaft there are two surfaces to be lubricated. In addition, there is the brass wearing ring which carries the weight of the bevel gear and eccentric. In some machines, the base is also designed to fit loosely in the eccentric to enable tipping from side to side. As all the pressure will be periodically imposed upon a comparatively small area near the top of the thickest part of the eccentric sleeve, tipping may lead to serious overheating and wear unless adequate lubrication is maintained.



Courtesy of Nordberg Mfg. Co.

Figure 7—The Nordberg Symons Cone Crusher showing oiling system and flow of oil. This can be maintained by an integral oil pump (as shown) or by an independent oil pump.

Automatic lubrication by oil delivered under constant and positive pressure to the mechanisms in question usually solves the problem. Fluid lubrication of this type is distinctly advantageous in that not only does the oil serve as a lubricant but also, to some extent, as a coolant to remove heat. Furthermore, the pressure under which it is circulated also tends to counteract somewhat the mechanical pressure developed when the gyratory is in operation.



Courtesy of Traylor Engineering & Mfg. Company.

Figure 8—Lubrication and constructional details for a Traylor type TY crusher. Oil flow is shown by arrows.

Oil circulation is maintained by means of an oil pump located at the base of the crusher either within or adjacent to the oil reservoir in the bottom plate. An ample supply of oil is contained in the system, which, as a rule includes a suitable filter or strainer through which the oil is continually passed. This together with the general dustproof construction insures against entry and circulation of an excess of abrasive matter through the system. All the lower moving parts are served with a flood of clean, cool oil while the crusher is operating, for the oil pump starts simultaneously with the latter and operates at a predetermined speed according to the speed or rate of crushing of the gyratory.

Where no oil pressure is provided, the rotation induces oil circulation by capillary attraction, the oil passing up through the clearance space around the journal, over the brass wearing ring and back through passages to the reservoir below. This is a simple and expedient method of maintaining dependable lubrication provided fresh makeup oil is added regularly (as experience indicates) and provided the reservoir is drained and cleaned regularly to remove accumulations of foreign matter before it can do any damage.

Temperature Control

Suitable coils are installed in the base of the oil reservoir through which hot or cold water can be circulated according to the prevailing outdoor temperature. This enables oil temperature control. Warm or hot water circulation is especially helpful when starting in cold weather. It will decrease the frictional drag which would otherwise develop within the oil due to the increase in viscosity. Heating the oil in cold weather also reduces

the load on the oil pump. In warm weather oil cooling is helpful, although under normal conditions of crushing, provided there is ample oil capacity, overheating will be unlikely, unless very hard rock is being handled.

Relation of Temperature to Oil Viscosity

The viscosity should be chosen with respect to the temperature. It should be in line with the manufacturer's recommendations. In cold weather an oil of lower viscosity is more dependable; conversely, for high temperatures use a heavier oil. Also consider the provisions for heat exchange, i.e. heating or cooling, and the temperature of the inlet water. Under extreme conditions, the operator should consult with his lubrication engineer.

Suspension Rings

The top bearings along with the suspension rings are contained in a spider at the top of the main shaft. These must also be carefully lubricated using an oil of sufficient body or viscosity so that it will not run prematurely through the clearances. Usually a lubricant comparable in viscosity to a light cylinder oil will meet this requirement. To facilitate retention of oil the space within the cap can be packed with a pad of wool yarn saturated with oil. By keeping this well loosened and not allowing it to pack or mat, relubrication, by adding a few ounces of oil daily applied via the oil hole in the spider cap, will suffice.

VERTICAL RING CRUSHING

Vertical ring machines crush over a vertical ring with crushing pressure developed through spring action, in contrast with the conventional gyratory which crushes on a more or less horizontal anvil ring. The drive varies. In some vertical mills a steel anvil ring is supported and revolved by a large horizontal gear driven shaft. Hammer rolls are held against the inner surface of this ring by means of springs. In operation the material to be crushed is delivered to the point of crushing through a spout, being kept at the ring surface by centrifugal force.

Other types of vertical ring crushers are driven by direct connected motors or belt and pulley connections through the top hammer roll instead of the ring. The movement of the top roll causes the ring to revolve; this in turn actuates the lower rolls.

Lubrication Requirements

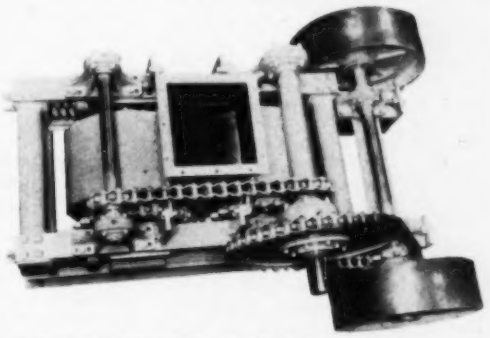
The bearings of the hammer rolls, ring shaft and pinion shaft along with the gears which comprise the drive all require careful lubrication. The hammer rolls are frequently mounted on roller bearings enclosed in dust-proof housings. These bearings operate normally in a bath of oil which is contained in, and circulated from the reservoir fixed to the end of the hammer roll shaft.

As this involves flood lubrication this oil should never be so heavy as to become sluggish and resistant to circulation. As a rule, a straight mineral oil having viscosity range of from 500 to 750 seconds Saybolt at 100 deg. F. will meet normal requirements and carry the operating load satisfactorily.

Ring shaft bearings and the higher speed pinion shaft bearings if kept free from dust or other nonlubricating matter do not present any lubrication problem. Speeds and loads are normally well-balanced. Oil lubrication by means of oil-saturated wool yarn, or a light grease will give ample protection.

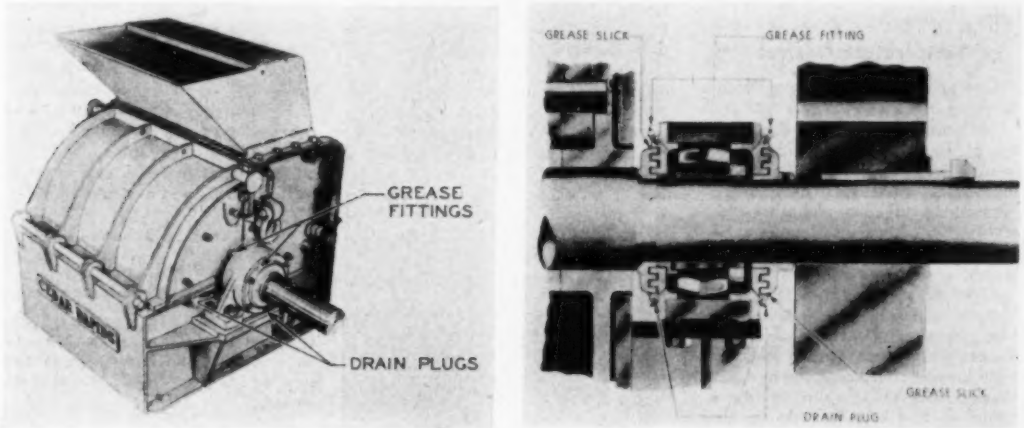
Gear lubrication also can be simplified by the means provided to prevent contamination of the lubricant. Oil-tight and dust-proof gear housings are well adapted to bath lubrication and the use of a light gear lubricant.

Ring crushers which are driven through the top roll require bear-



Courtesy of Diamond Iron Works Inc. & Mahr Mfg. Co. Div.

Figure 9—Three-quarter top view of a Diamond roll crusher. Each bearing on this machine is equipped for individual pressure grease lubrication.



Courtesy of Iowa Mfg. Company

Figure 10—Details of a Cedarapids Hammermill showing bearing design and location of grease fittings and drains.

ings on each of the hammer roll shafts. These are long and fitted with collars to exclude dust or grit. Each bearing is equipped with a large reservoir capable of holding a quantity of grease which is led in via grooves on the low pressure side. Usually an N.L.G.I. No. 1 grade will meet the requirements.

SECONDARY CRUSHING OR GRINDING

Secondary reducing units pulverize the rock after primary crushing. Ball, rod or compartment mills, or a cone crusher, which produce a final product of remarkably uniform fineness are classified as secondary crushers. Cement rock which must be ground just as finely before burning as after, is run through these machines.

The design involves a horizontal steel drum which is partially filled with steel balls or rods. As the drum is turned by a set of enclosed motor driven reduction gears the balls or rods roll continually to the bottom, grinding the particles of rock between and beneath them. Due to the loads involved, the bearings must be designed accordingly, being comparatively large, in order that the unit loads may not become excessive. In addition, lubrication must be maintained very often in an atmosphere of grit or dust. Naturally, therefore, due precaution is taken in design to keep this dust out of the bearings.

A fairly heavy lubricant is generally used. Fortunately, speeds are low, so there is no objection to a heavy lubricant from this angle. In other words, it is practicable to use a medium-to-heavy grease which will carry the prevailing loads satisfactorily and seal effectually against entry of abrasive dust.

Temperature Control

Overheated bearings may result from

(1) entry of abrasive dust, (2) use of an unsuitable lubricant, (3) insufficient lubrication, (4) some mechanical fault such as misalignment or insufficient clearance, (5) transmitted heat as for example when grinding relatively hot materials.

Overheating should be corrected as soon as possible, even though this may require stopping the mill. Where it is not practicable, the troublesome bearing can be loosened, flooded with oil or subjected to external cooling by a fan. At the first opportunity the bearing should be examined to see that the grooves and lubricant feeds are clear and not clogged. If the temperature has risen sufficiently the bearing metal may have become soft enough to wipe.

Trunnion Bearings

Trunnion bearings are comparatively large. In cement mill service in particular they are exposed to the possible entry of dust and grit and the probability of heat being transmitted to the bearings from the shell. Sometimes these bearings are lined on the bottom half only since the direction of load is always downward. This facilitates relining if the bearing metal becomes worn or unduly scored. In such cases, the bearing cap serves as a dust shield and if desired as a receptacle for the grease used in lubrication.

Grease for this type of service should be carefully refined, fibrous product of high melting point. Wherever wool yarn packing is desired a lighter grease or a high grade mineral oil can be used. The wool yarn serves as a seal or strainer to prevent dust or dirt from getting to the bearing. Bearing temperatures can be controlled by cooling water circulation when the design will permit.

Bearings Designed for Automatic Lubrication

Bearings of the two-part type can also be designed for automatic lubrication. Here the cap as well as the bottom half is lined. Oil is carried in a suitable reservoir below the latter, being distributed by a dipper device which is rotated by the shaft. The usual construction provides for two of these dippers which at every rotation automatically fill themselves with oil to empty it along the top of the shaft. From this point, it is distributed throughout the clearance space.

When these bearings are water-cooled the temperature is so controlled that a medium-to-heavy viscosity oil will give ample protection. Bearings of this type keep out abrasive foreign matter as a rule. Furthermore, as they are flooded with oil any dust or dirt which may be present will be flushed down into the reservoir. Normally it will settle here and can be removed by draining at periodic intervals.

Roller bearings are also adaptable to trunnion service. They are regarded as being quite as advantageous as the self-oiling plain bearing even though the former may not have as ample a lubricant reservoir. Either oil or grease can be used according to the type of seal and the means of relubrication provided by the designer.

Ring oiled bearings are another type of self-lubricated mechanism which can be applied to ball and tube mill machinery. They are well suited to pinion shafting. Such bearings are best served by a light-medium straight mineral oil of around 300 seconds Saybolt Viscosity at 100 deg. F.

Ring oilers should be cleaned at regular intervals. At the same time fresh oil should be added. Most troubles with ring oilers will be due to the reservoirs being too small to allow the oil to cool sufficiently, especially if relatively high bearing temperatures prevail. Under such conditions it may be practicable to increase the oil capacity by tapping a short length of pipe into the lower part with a cap on the lower end.

Wick feed oilers also are used. They are particularly suited to existing installations due to their low initial cost and the ease with which they can be applied. Wick oiling assures of positive lubrication and dependable operation. As it assists in reducing bearing wear, it contributes to lower maintenance and repair costs .

Rock Drill Performance

(*From page 57*)

for stripping the 18 to 20 ft. of overburden which covers the stone. Two new 15-ton Euclid quarry-type, end-dump trucks have been purchased for hauling, and it is planned to acquire one more in the near future. Loading at the quarry face is done with a Koehring 605 electric shovel.

One of the older producers of limestone and limestone products in the east, the Grove company was established in 1859 and incorporated in 1889. The company operates five plants in all—three at Frederick, where ready-mixed concrete, concrete masonry units, and concrete pipe are produced in addition to crushed stone, lime and masonry mortar—and one each at Middletown and Stephens City, Va.

Anchorage Plant Receives First Bulk Cement Shipment

Officials of the Permanente Cement Company have announced the first shipment of cement sent to Alaska in bulk instead of in paper bags, as has been the custom.

Permanente made its first bulk shipment—15,000 barrels—to Anchorage in a converted LST barge, to be stored in the company's distribution plant there.

American Society for Testing Materials Holds 53rd Annual Meeting

By C. E. PROUDLEY
Chief Materials and Test Engineer, North Carolina State Highway and Public Works Commission

another P and Q exclusive

THE most outstanding specification-writing body for materials for every industrial purpose met in Atlantic City, N. J., June 26 through 30, to take action on recommendations of its various committees and to hear technical papers on a wide variety of subjects dealing with methods for inspection and testing. The membership of the society as of June 1, 1950, was 6,761 of which 1,658 were companies, firms, etc., and 4,739 individual memberships. There are 214 sustaining members who support the society through the payment of larger dues, as well as by their activity in committee work through individual or company membership. The total operating expenses of the society amount to nearly one-half million dollars per year.

The attendance this year was the largest on record — approximately 2,500, including more than 300 ladies. The size of the meeting and the fact that a major portion of the activities is concerned with meetings of the committees and subcommittees, 459 of them, accounts for the repeated use of Atlantic City for A.S.T.M. annual meetings. During the five days 25 general sessions were held in addition to the committee meetings. Atlantic City has many attractions which are enjoyed by the members but, contrary to the widespread belief among those who have never attended one of these annual meetings, the Boardwalk and city lights, surf bathing and suntanning are not the reasons for selecting this seashore resort for the meeting place; it is the hotel's ability to provide sufficient meeting rooms.

This was the year for an exhibit of testing apparatus and related equipment—the ninth sponsored by the society. Forty exhibitors presented displays in the show.

Committee C-1 on Cement elected new officers this year. R. R. Litehiser, chief engineer, Ohio State Highway Testing and Research Laboratory, is the chairman, succeeding F. H. Jackson, who has served since 1945. The vice-chairman is W. C. Hanna, chief chemist, California Portland Cement Company; and the new secretary, succeeding J. R. Dwyer, is W. S. Weaver, research engineer, Canada Cement Company, Ltd., Montreal.

Mr. Hanna's subcommittee on methods of chemical analysis reported comparisons of the flame photometer with the chemical method of analysis in determining sodium and potassium oxides on 29 samples of portland cement which ranged from 0.20 to 1.31 percent when reported as Na_2O. The average difference between the two methods was 0.031 percent and the maximum 0.07. Since the usual specification limit is 0.6 percent, it is obvious that the flame photometer furnishes a reliable method except, perhaps, in cases of dispute. Much of the work of this subcommittee was credited by Mr. Hanna to L. R. Pritchard, chief chemist, Lone Star Cement Corporation. Plans are shaping up for a symposium at the 1951 annual meeting on the use of flame photometric methods for the determination of various constituents of portland cement.

Method for determination of the time of setting of portland cement is in the process of revision by the subcommittee headed by E. E. Berger, chemist, Kosmos Portland Cement Company, Inc., who reported a method using 1:1 mortar and an alternate method on neat paste with a 25 mm. penetration of the needle.

C. E. Wuerpel, technical director, Marquette Cement Manufacturing Company.

The committee on bleeding, plasticity and workability, under the chairmanship of H. L. Kennedy, Dewey & Almy Chemical Company, has proposed a tentative method of test for bleeding of cement pastes and mortars which is published with Committee C-1's report. The water which bleeds out of the freshly mixed paste or mortar is collected in a burette attached to an inverted funnel above the mixture, on which there is a layer of about 1 in. of carbon tetrachloride. CCl_4 is drawn up into the burette through the funnel, and any water bleeding from immediately under the funnel will rise in the burette, where it can be accurately measured.

One of the activities of Committee C-1 for many years has been to approve materials which, under the definition of portland cement, can be added to the cement at the mill for the purpose of air entrainment. The subcommittee on this project, under the direction of C. H. Scholer, professor of applied mechanics, Kansas State College of Agriculture and Applied Science, has been working on two materials known as NTAIR and Airlon, the former manufactured by Newport Industries, Inc., and the latter by Dewey & Almy Chemical Company. These have been approved and appear in the list of air-entraining agents acceptable under Specification C 175-T. It is probable that this function of the committee will be eliminated with the adoption of Tentative Specifications for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Portland Cement (C 226-50T).

As a result of considerable cooperative study of the effect of SO_3 content on durability in freezing and thawing tests, the subcommittee on SO_3 content, H. S. Meisener, research engineer, U. S. Bureau of Reclamation, Denver, chairman, expects to propose a performance test requiring less than 24 hours to complete, instead of the limitation of the SO_3 in the specifications.

Ottawa sand used in testing portland cement has been found to have certain air-entraining properties as a result of the bituminous waterproofing used in the bags in which the sand has been shipped for a number of years. John R. Dwyer, chairman of the subcommittee on

coordination of methods of test and research associate, National Bureau of Standards, in cooperation with C. E. Wuerpel, technical director, Marquette Cement Manufacturing Company, have been experimenting with a polyethelene liner.

Revision of C 150 to delete the names of additions and make reference to C 226-50T is in order, since the latter specification has been approved by the Administrative Committee on Standards. Chairman R. R. Litehiser made reference to this in his report of activities of the sponsoring committee on portland cement of Committee C-1. He said that it will probably be required also that the name of the addition be shown on the bag.

It has been agreed by the committee that tensile strength requirements will govern unless the purchaser designates the compression test. The provision that a 28-day test for Type III cement may be requested by the purchaser is recommended for deletion. Consideration is being given by the sponsoring committee on portland cement to increasing the strength requirements in C 150; also for tensile strength requirements for inclusion in C 175, where only compression requirements exist at present.

Committees C-1 on Cement and C-9 on Concrete and Concrete Aggregates have been invited by the Portland Cement Association to hold their fall committee week at their recently dedicated Laboratory Building in Skokie, Ill., October 9 and 10. A visit to the association's Naperville concrete test farm is being planned for the day following the meeting.

Tentative specification for standard strength perforated clay pipe, (C 211-47T) was recommended for advancement to standard without change by Committee C-4 on clay pipe. This committee also organized a new subcommittee (III) with Wendell D. Anderson, chief engineer, Manufacturer's Promotional Service, as chairman, on clay flue lining. J. C. Riedel, chief engineer, Board of Estimate, City of New York, is the chairman of Committee C-4.

During the twenty-first general session, following the report of Committee C-7 on Lime, a paper by J. A. Murray, H. C. Fischer and D. W. Sabean, associate professor, research associate and research assistant respectively, Massachusetts Institute of Technology, on *The Effect of Time and Temperature of Burning on the Properties of Quicklime Prepared from Calcite* was presented. Pure calcite of 10- to 20-mesh size was calcined in a continuous-feed, electrically heated rotary tube at various temperatures from 1,700 to 2,400 deg. F., and with over-all retention times varying from 46 to 474 minutes. Density, porosity, surface area, and reactivity with water were determined on the product from each of the 40 calcinations. Porosity of quicklime is determined primarily by the rate of heating prior to and during calcination, while the heating conditions subsequent to calcination have relatively little effect. When material of this size required 35 minutes or more to reach 1,700 deg. F., the resulting quicklime was always highly porous; but with shorter periods the porosity was correspondingly less. Porosity determines the rate of reaction with water. The more porous the quicklime the higher its surface area and the faster it reacts.

P. M. Woodworth, director, research and development, The Waylite Co.

Committee C-9 on Concrete and Concrete Aggregates elected officers for the ensuing two years. Chairman K. B. Woods, vice-chairman Fred Hubbard and Secretary Stanton Walker were re-elected after considerable persuasion by the nominating committee. Four new members were elected to the executive committee of C-9. They are L. E. Gregg, associate research engineer, Kentucky Highway Materials Research Laboratory; H. L. Kennedy, manager of cement division, Dewey & Almy Chemical Company; Walter H. Price, materials engineer, U. S. Bureau of Reclamation, Denver, and Harold S. Sweet, assistant professor, University of Wyoming. A. T. Goldbeck, R. R. Litehiser, J. H. Swanberg, and L. W. Teller continue on the executive committee.

In the research group of Committee C-9, subcommittee II-d on durability of concrete, C. H. Scholer, chairman, is working on and hopes soon to present for consideration a tentative method for the examination of concrete in structures for the determination of its condition. W. H. Hanna's Committee II-b in this group met during the week and had a round-table discussion on reactivity of aggregates in concrete, all of which is not the result of high alkali content of the portland cement, according to experiences recited by those in attendance. Sulphates and carbonates of lead and copper in mine tailings after a period of weathering have been known to prevent hardening of concrete.

Subcommittees of C-9 dealing with specifications and test methods includes III-a on methods of testing concrete for strength, with A. G. Timms, senior materials engineer, U. S. Bureau of Public Roads as chairman. Apparatus, especially that used in the field, is presently of greatest concern to the subcommittee, and particular attention is being given to the design of paper cyclinder molds for making compression test specimens. A number of cases of seriously impaired strengths have been reported as a result of using molds improperly paraffined and carelessly glued. Cold-dipped paraffin molds have the least absorption. Metal bottoms crimped to the mold are preferable to glued paper bottoms. The subcommittee is undertaking to write a specification for satisfactory paper molds, as well as for other items used in the fabrication of concrete test specimens.

There are at present three methods recognized by the society for determining the air content of air-entraining concrete, Sub-committee III-c, I. L. Tyler, manager of field investigations, Portland Cement Association, chairman, is endeavoring to bring all three into one standard method. There is still considerable controversy over which of the methods can be relied upon to give accurate results at all times, although the leaning seems to be towards the gravimetric method.

After many years of argument within the subcommittee, a bold step has been taken by III-d under the chairmanship of H. F. Clemmer, engineer of materials, District of Columbia, in proposing a Tentative Specification for Concrete Aggre-

gates, revising C 33, to give limiting values for the various test results, notably tensile strength ratio, sulphate soundness, deleterious substances, and Los Angeles abrasion. Although escape clauses are provided to take care of localities which are unable to meet the stated limits, the values have been tentatively set at 90 percent minimum for mortar strength ratio; 10 percent minimum for 5 cycles of sodium or magnesium sulphate soundness test of sand; 12 percent for 5 cycles on coarse aggregate; and an abrasion loss of not more than 50 percent. Alkali-reactive aggregates are recognized, and some new ideas are suggested for controlling the gradation of fine aggregate.

The subcommittee on methods of testing and specifications for lightweight aggregate for concrete, III-f, P. M. Woodworth, director of research and development, The Waylite Company, chairman, is working on a classification system for fine and coarse lightweight aggregates which will group them primarily according to weight per cubic foot. Type I would be 5 to 15 p.c.f.; Type II from 15 to 30 p.c.f.; and Type III from 30 to 50 p.c.f. by dry-loose measure. Feasibility of a compressibility test is being studied. Grading limits for the coarse aggregate sizes No. 4 to ½-in., and No. 4 to ¾-in. are to be established, but there will be no limits for the fine aggregates of the 0-30 or 0-8 designations. Type I would be described as insulating lightweight aggregate and Type III as load-bearing lightweight aggregate.

Entering into the discussions in the meetings of Committees C-1 and C-9 was A. R. Collins, technical director of the British Cement and Concrete Association, Grosvenor Gardens, London, who is well known to a number of the society's members for his assistance to them during their inspection trips of concrete structures and pavements in Europe in recent years.

The importance of admixtures since the advent of air-entraining concrete has increased the importance of C-9's Subcommittee III-h on methods of testing and specifications for admixtures, under the direction of Bryant Mather, head, Petrography section, Waterways Experiment Station, Jackson, Miss. *Tentative Methods for Testing Air-Entraining Admixtures* (C233-49T) was issued last year and has now been revised to change the volume change requirement to 0.01 greater than the specimen made with the blank cement instead of a limit of 1.0 percent of the volume change of the blank specimen, the present method of stating it being impracticable where the blank specimen has a very small volume change. Work is now under way on a *Tentative Specification for Air-Entraining Admixtures for Concrete*. Mr. Mather's subcommittee is cooperating with the sponsoring committee on blended cements of Committee C-1 in the development of a specification for fly-ash for use in concrete. In connection with this endeavor he is planning to distribute a suggested specification for fly-ash with a questionnaire to members of the subcommittee and to all interested parties for criticisms, suggestions, etc. Those interests wishing to express an opinion in this work should communicate with Mr. Mather.

One of the papers of special importance to engineers and technicians engaged in the study of concrete and concrete materials and one which should be of increasing usefulness in laboratories concerned with mineral aggregates was given during the meeting by Bryant and Katharine Mather on *A Method of Petrographic Examination of Aggregates for Concrete*. This gives a detailed description of the method developed for use by the Concrete Laboratory of the Corps of Engineers. It lists apparatus and supplies for specimen preparation and specimen examination, then treats of the methods for examination of aggregates from the various types of deposits. This paper should furnish the basis for a specification for a uniform approach to this type of examination of mineral aggregates by all laboratories and should encourge research workers in concrete in the more extensive use of this generally neglected tool. Mr. and Mrs. Mather are to be commended for this excellent contribution.

Another paper of interest to Committees C-1 and C-9 was prepared by J. R. Leslie, research engineer, the Hydro-Electric Power Commission of Ontario, Toronto, on *Pulse Techniques Applied to Dynamic Testing*. The apparatus described is popularly known among investigators of properties of concrete as the Soniscope. In this method the propagation of an acoustical pulse through the material is measured. The pulse velocity is unaffected by size or shape of the specimen, and the elastic modulus may be calculated using one simple formula for all cases: $E = CdV^2$, in which E is the elastic modulus, C is a constant involving only Poisson's ratio, and V is the compressional pulse velocity. It appears that for standard concrete pulse velocities of 13,000 to 16,000 ft. per sec. indicate that the condition of the concrete is good to excellent; velocities under 10,000 ft. per sec. indicate concrete in poor condition.

Officers of Committee C-11 on Gypsum were elected for the ensuing two years. Chairman L. S. Wells and Vice-Chairman H. F. Gardner were re-elected. L. H. Yeager was elected secretary to succeed C. E. Abbey. The *Standard Specifications for Gypsum* (C22-41) were recommended for immediate revision to change $CaSO_4.2H_2O$ content from 64.5 to 70.0 percent, subject, of course, to letter ballot of the society. In the *Standard Specifications for Gypsum Plasters* (C28-40) one change involves reference to approval of the following: "The calcined gypsum plaster in these specifications shall have a purity of not less than 66.0 percent by weight of $CaSO_4.\frac{1}{2}H_2O$." The same applies to gypsum neat plaster, gypsum wood fiber plaster and gypsum gaging plaster. Compressive strength is being substituted for tensile strength, with the following required for compression: "Gypsum ready-mixed plaster when dry shall have a compressive strength of not less than 400 p.s.i. However, this strength requirement does not pertain to plasters prepared for application to porous masonry bases."; "Gypsum neat plaster is tested with two parts of Ottawa sand shall have a compressive strength of not less than 750 p.s.i."; "Gypsum wood-fibered plaster when dry shall have a compressive strength of not less than 1,200 p.s.i." *Gypsum Molding Plaster Specifications* (C59-40) are recommended for change to require a $CaSO_4.\frac{1}{2}H_2O$ content of not less than 80 percent, and compressive strength of not less than 1,800 p.s.i.

Setting time for Keene's Cement (C61-40) has been changed to not less than 20 minutes nor more than 6 hours, and the compressive strength recommended as a minimum of 2500 p.s.i. *Gypsum Wallboard* (C36-42), *Gypsum Lath* (C37-42), and *Gypsum Sheathing Board* (C79-42), will contain the following sampling requirement: "At least 0.25 percent of the number of gypsum (wallboard, lath, or sheathing boards) in a shipment, but not less than one board (ten lath), shall be so selected as to be representative of the shipment, and

shall constitute a sample for purpose of tests. When a shipment consists of more than one car or carrier load, a sample shall be taken from each car or carrier." Dimensional and weight revisions have also been recommended subject to letter ballot of the society.

Committee C-15 on Manufactured Masonry Units re-elected its incumbent officers with the exception of the secretary, M. H. Allen, Structural Clay Products Institute, Iowa-Minnesota region. In the meeting of Subcommittee III, R. E. Copeland, director of engineering, National Concrete Masonry Association, Chicago, chairman, the proposal was made to change the dimensional limits from 3 percent to 3/16-in. for concrete masonry units, also to add another grade of block to be designated "AA" having a minimum compressive strength of about 1,500 p.s.i. Some thought was given to decreasing the moisture content from 40 percent to 30 percent for all concrete blocks.

Dr. F. O. Anderegg, director of building materials research, John B. Pierce, Foundation, Raritan, N. J., presented a paper at the session on cement and concrete entitled *Results on Testing Surface Waterproofings* which pertained to applications on masonry structures. As a result of many years of investigation, Dr. Anderegg has prepared a tabulation included in the report evaluating surface waterproofers according to type, absorption, transpiration rate, resistance to efflorescence, resistance to weathering, initial appearance, ease of application, and relative cost of application in cents per square foot. The types included are the cement type, solvent type—clear, solvent type—pigmented, emulsion systems (which include resins usually with plasticizers such as polyvinyl acetate and polystyrene), silicones, and sprayed-on stuccos. In his discussion of the tabulation and the investigational work involved, Dr. Anderegg pointed out a number of advantages and limitations for each which could not be indicated readily in the table. The greatest hazards to waterproofers seem to lie in the pressures developed by efflorescent salts, by rain erosin, and by oxidation.

Committee D-4 on road and paving materials reported progress on specifications and methods of tests for bituminous materials as the major portion of their work. Subcommittee B-12 on structural properties of mineral aggregates, however, has been struggling to develop a test for quality of fine aggregate. Six laboratories represented in the subcommittee reported results of compression tests made since the Pittsburgh meeting. It was agreed that the results should be published, probably in the BULLETIN, for future reference. Further work is promised in which the fine aggregate will be tested in compression after combination with a bituminous binder or other standardized medium. Previously made abrasion tests of fine aggregates have shown little, if any, promise. Quality of coarse aggregate, as indicated by the Los Angeles Abrasion test using test grading "E," has been found to be discouragingly out of line with the values obtained with grading "A," and it will be necessary for this subcommittee to make further investigation of the most recently proposed tentative revisions of C 131 which deal with tests of sizes coarser than 1½-in.

Tentative Specifications for Crushed Stone, Crushed Slag and Gravel for Single Surface Treatment will be submitted to letter ballot of Committee D-4, as a result of work of Subcommittee C-12 guided by Chairman William H. Mills Jr., district engineer, The Asphalt Institute, Atlanta. The definitions pertaining to surface treatment and single surface treatment are still in controversy as regards the work of this subcommittee, and after some clarification further specifications will be proposed for multiple treatments, as well as recommendations for types and quantities of bitumen to be used in such work.

D-4 elected officers for the next two years: C. E. Proudley, chief materials and test engineer, North Carolina State Highway and Public Works Commission, chairman; and Bailey Tremper, materials engineer, State of Washington Department of Highways, Olympia, first vice-chairman. A. T. Goldbeck, second vice-chairman, and E. W. Klinger, third vice-chairman, as well as Secretary B. A. Anderton, continue in office. The next meeting of Committee D-4 will probably be October 11 and 12, in Chicago.

The committee which, probably, has the broadest scope of interest of any in the society is E-11 on quality control of materials. During the last year it has completed work on the first three sections of the A.S.T.M. *Manual on Quality Control of Materials* which constitute revisions of the present A.S.T.M. *Manual on Presentation of Data* with its Supplements A and B. In addition, task groups have been working on a survey of A.S.T.M. sampling plans, recommended practices for planning inter-laboratory tests, procedures for determining the number of tests for a desired precision of an average, sampling of bulk materials, and fitting of curves for a linear relationship. Officers of Committee E-11 elected for a term of two years are as follows: chairman, H. F. Dodge, Bell Telephone Laboratories, Inc., New York City; vice-chairman, A. E. R. Westman, Ontario Research Foundation, Toronto; secretary, O. P. Beckwith, Alexander Smith & Sons Carpet Co., Yonkers, N. Y. Two new members of the advisory committee are C. A. Bicking of the Hercules Powder Company, and E. G. Olds of the Carnegie Institute of Technology.

Engineering Construction Tops $930,000,000 in May

Heavy construction contracts hit the new peacetime high of $931,153,000 in May. This is 59 percent over a year ago and 5 percent over April, as reported by *Engineering News-Record*. This May record tops previous records for each preceding month this year. Total contracts for the five months amount to $4,411,346,000, 43 percent higher than for the first five months of 1949.

Street and road volume set a new record in May of $127,000,000, 21 percent above April and 10 percent higher than the previous record of July, 1949. Mass housing accounted for the largest volume in May—$273,000,000 or 119 percent over May a year ago, but 20 percent under the April, 1950, record. Public construction in May stood at $438,000,000 or 31 percent over April and 26 percent over the May, 1949, figure. Private construction is $493,000,000, 111 percent over a year ago, but 10 percent under April.

Industrial building, which reached $125,000,000 in May, was 64 percent over April and 160 percent over May, 1949. This strong May upturn puts the five-month industrial building contracts 24 percent ahead of last year.

The University of Missouri School of Mines and Metallurgy is undertaking a study of blasting caps used with explosives, according to Dean Curtis L. Wilson. Object of the study will be primarily to determine whether there is any difference in the gradation and volume of broken rock resulting from any given blast through the use of different types of blasting caps.

Great Lakes Carbon Corp. Turns Out 10,000 Bags Of Permalite per Day

another ON THE SPOT report

By HARRY F. UTLEY

AFTER several years of painstaking research and experimental development, Great Lakes Carbon Corporation is this year attaining high volume production of expanded perlite. Marketed under the trade name "Permalite," output comes from two modern plants located at Torrance, Calif., and Linden, N. J.

The Torrance plant has a slight edge in capacity—150 tons per day of finished product from the two-kiln plant. Translated into volume, however, since the average weight of the popped material is only 7½ lbs. per cu. ft., this is the equivalent of 40,000 cu. ft. of Permalite, or a total of 10,000 bags of 4-cu. ft. each per day. By far the greatest use of the material is as a lightweight plaster aggregate, although its use as the aggregate in lightweight concrete continues to increase.

How Great Lakes Carbon attained its position as the country's leading producer of this new material, culminating in the completion of the Torrance plant as the largest perlite-processing plant in existence, is in itself a fascinating story of scientific research and development in which geologists, chemical engineers, and production experts cooperated. Early in the 1940's, the company started popping experiments and began searching for high-grade deposits. From approximately 400 different Western perlite properties, samples were taken and laboratory expanding tests conducted. Both size and quality determined the final selection, which narrowed the choice to three large deposits of uniform raw perlite which the company subsequently acquired. These are at Antonito, Colo., Socorro, N. M., and Picket Post Mountain in Arizona.

Meanwhile, processing experiments had led to the decision to build a small pilot plant at Torrance, Calif., for further investigation into the best methods of producing a large volume of uniform product at the lowest possible cost. The pilot plant began operating four years ago. Critical points of control in the popping operation were determined and furnace and kiln capacity and efficiency were studied, pointing the way to a final choice of equipment and layout. The pilot plant had a 10-ton daily capacity at the start. This was gradually expanded until, by early 1949, capacity was stepped up to 30 tons per day. Meanwhile, alternative processes were tested and discarded.

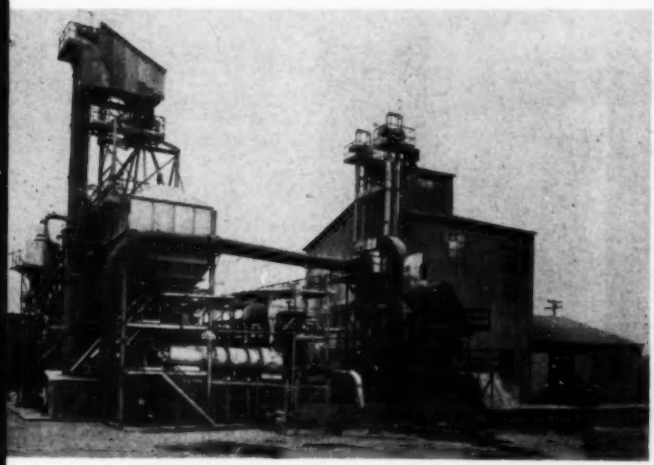
Having decided that short, refractory-lined rotary kilns in which the fine raw perlite particles could expand rapidly under careful control was the answer, the company speedily erected its new and modern all-steel, push-button-controlled plant at Torrance. Two of these kilns have been installed, each with a capacity of 75 tons of expanded perlite per day.

While the Torrance plant is equipped with crushing equipment to reduce the size of the raw rock, this department is merely in standby service, all crushing being done at the Socorro, N. M., quarry. The crude material arrives at Torrance in lined box-cars with a maximum size of ⅜ in. It is unloaded and elevated for storage in a 350-ton concrete-stave silo, recovery being by belt conveyor and elevator to the sizing screens for distribution into four steel kiln-feed bins above the two rotary kilns.

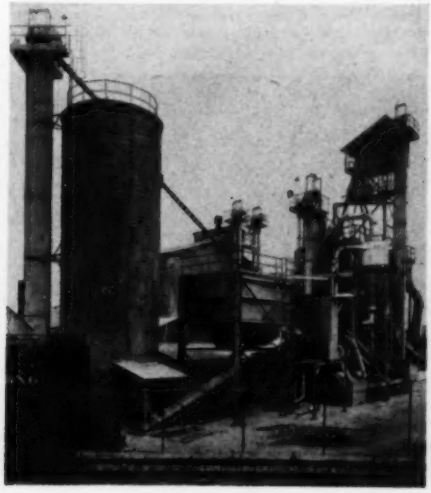
The kilns are fired either by natural gas or oil, using the same burning equipment. (Gas is normally used.) The sized raw material enters the kiln at the firing end. The raw perlite is sampled six times daily, just before it enters the kilns, for particle size, particle-size distribution, and free-water content.

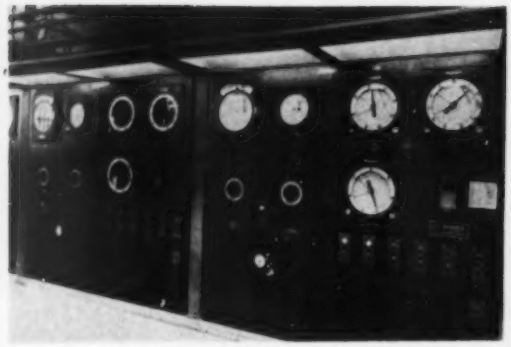
As all perlite producers know, and as Great Lakes early discovered in its experimental work, extremely critical control is necessary in popping the material, to insure a high-grade product of uniform density,

• A general view of the Great Lakes Carbon Corporation's Permalite plant at Torrance, Calif.

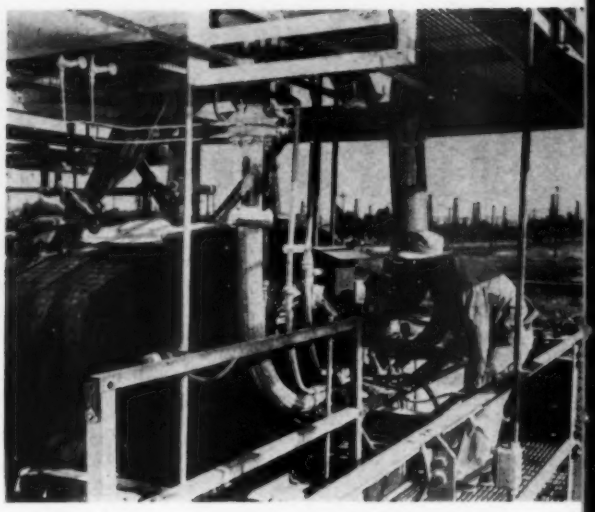


• Another view of the Torrance plant, showing the railroad siding and crude storage silo.





• The control panel board for the No. 1 and No. 2 kilns at Torrance.



Right: One of the operators at the combustion chamber of the No. 1 kiln. The kilns are fired by natural gas or oil—normally with gas.

strength, and other desirable characteristics. The up-heat rate, the temperature level, and the time of retention within the kiln are of extreme importance. These factors are all under instrument control at the Torrance plant. All are regulated from a central control panel, and all changes are made on an electrical impulse.

The feed rate is controlled by an automatic-weighing feeder which puts the fine raw perlite into the kiln at a constant rate. The up-heat rate—or rate at which the material is heated—is regulated by an oil-flow gas-flow air-flow temperature recorder-controller, an excess-deficiency combustion air recorder-controller, and a kiln pressure recorder-controller. The temperature level is held at the proper point by a temperature recorder-controller.

Instruments are so interlocked that, even though the feed rate should for some reason vary, the instruments automatically compensate by changing the gas-air ratio, the kiln pressure, the up-heat rate, and the temperature level. Particle size and density of the finished product, too, are controlled from the remote central panel board. For instance, to change the density of the product, it is necessary for the operator merely to change the adjustment on the feed-rate controller or the adjustment on the temperature-level controller.

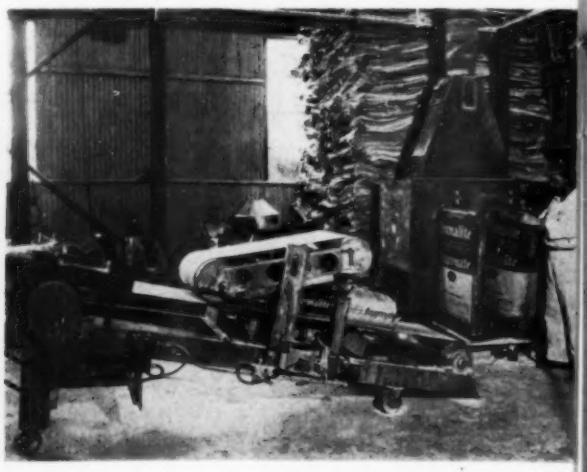
Some idea of the range of control possible at the plant may be obtained from the fact that at the present time and with the same equipment, six different types of finished product, with bulk densities ranging from 2 to 20 lbs. per cu. ft., can be produced.

Discharged from the kilns, the expanded perlite is cooled at a controlled rate, air-separated by a pair of cyclones, and conveyed pneumatically to the pack-house, where it is elevated to the bins feeding the packing machine. Dust from the cyclones and at other points where it may originate is piped to two Rotoclone wet-type collectors.

The finished Permalite is packed into 4-cu. ft. paper valve bags by a special two-spout packer and carried to pallets for stacking by a portable belt conveyor equipped with a leveler to flatten the filled bags for easy stacking and to prevent shifting after they are loaded into cars or trucks. Each bag is stencilled with the date, hour, and minute of manufacture. This en-

(Continued on page 96)

• Quality control testing makes possible the production of a high-grade product at all times.



• A closeup view of the two-spout packer and the mechanical leveler, equipment used for packing Permalite in 4-cu. ft. valve bags.

North Carolina Concern Sinters Clay to Produce Lightweight Aggregate

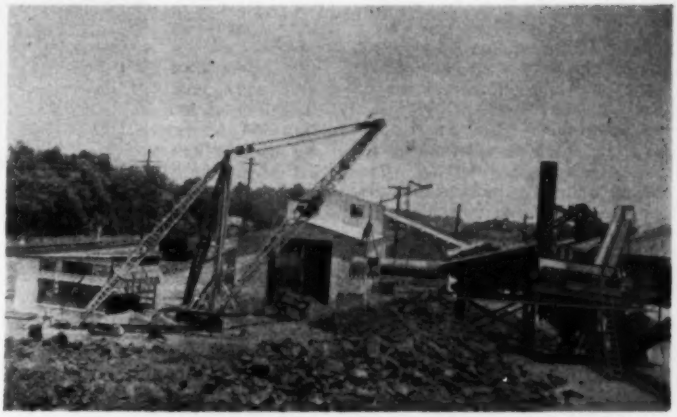
By WILLIAM M. AVERY

another ON THE SPOT report

A NEW concern and a new product made their debuts simultaneously a few weeks ago when a plant for manufacturing lightweight aggregates from clay by the Dwight-Lloyd sintering process was placed in operation at Salisbury, N. C. The product is being produced and marketed under the trade name Tuff-Lite by the newly-formed Carolina Tuff-Lite Company. The new plant is of particular interest because it is believed to be the first in the lightweight-aggregate industry to employ the well-known Dwight-Lloyd process, developed originally for the metallurgical industry by A. S. Dwight and R. L. Lloyd, and marketed by the Sintering Machinery Corporation.

Early operations of the plant indicate that it will readily produce prime lightweight aggregate at the 45-cu. yd. per hr. rate for which it was designed. Some part of this relatively high output is undoubtedly due to the excellent sintering characteristics of the residual shale deposit from which the raw clay for the operation is obtained. On average clays the same 42-in. by 66-ft. sintering machine would be rated by the manufacturer at approximately 25 cu. yds. per hr. Almost inexhaustible reserves of the raw material are located within a short truck-haul of the plant.

The raw clay is recovered from an open pit by a Bucyrus-Erie 1-cu. yd. 22-B diesel-powered shovel and transported in 2-ton Studebaker dump trucks to a covered storage area. There it may be placed in storage or dumped directly into the primary feed hopper located over a 4-roll J. L. Steele clay feeder (unit "A" on the accompanying general arrangement drawing).

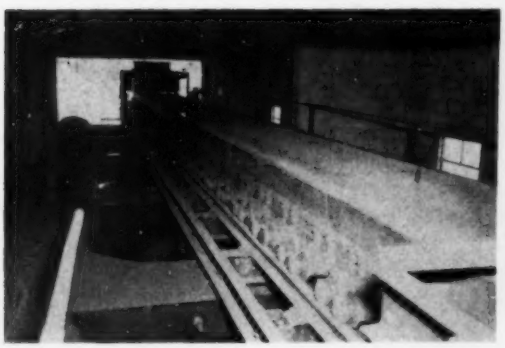


A general view of the Carolina Tuff Lite Company's new plant for manufacturing lightweight aggregates from clay. The sintering machine is housed in the building just beyond the boom of the stiff-leg derrick.

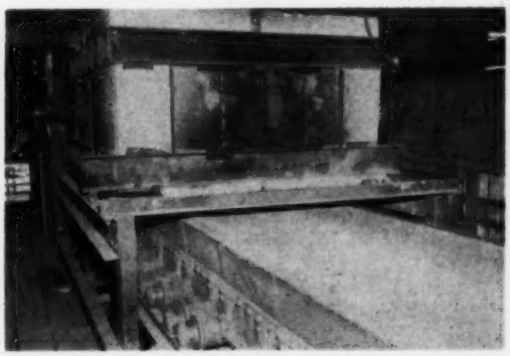
A 24-in. inclined belt conveyor (unit "B") elevates the raw material to a slow-roll Miller hammermill (unit "C") operating at 600 r.p.m., from which it passes by gravity over a Meco piano-wire clay screen (unit "D"). The throughs drop onto an 18-in. inclined belt conveyor (unit "E") and are discharged into the main feed hopper (unit "F"), which serves as a surge hopper to prevent the clay from recompacting. The rejects from the screen drop onto an 18-in. return belt (unit "DB") for recrushing in closed circuit.

The clay is fed from the main hopper by means of a 36-in. wide, rubber-covered belt feeder, the volume being controlled by adjusting a gate on the front plate of the hopper. Since the feeder is driven from the tail pulley of the main collector belt (unit "H"), the rate of feed is also determined by the speed of the belt.

Fine coke, which is used as fuel in the sintering process, is fed onto the collector belt just beyond the



The sintering machine is 42 in. wide by 66 ft. long over the windbox section. The mixture of clay and fine coke is ignited as it passes under the hood in the background.



A closeup of the ignition hood. The bed of material rides on 24- by 42-in. cast-iron pallets.

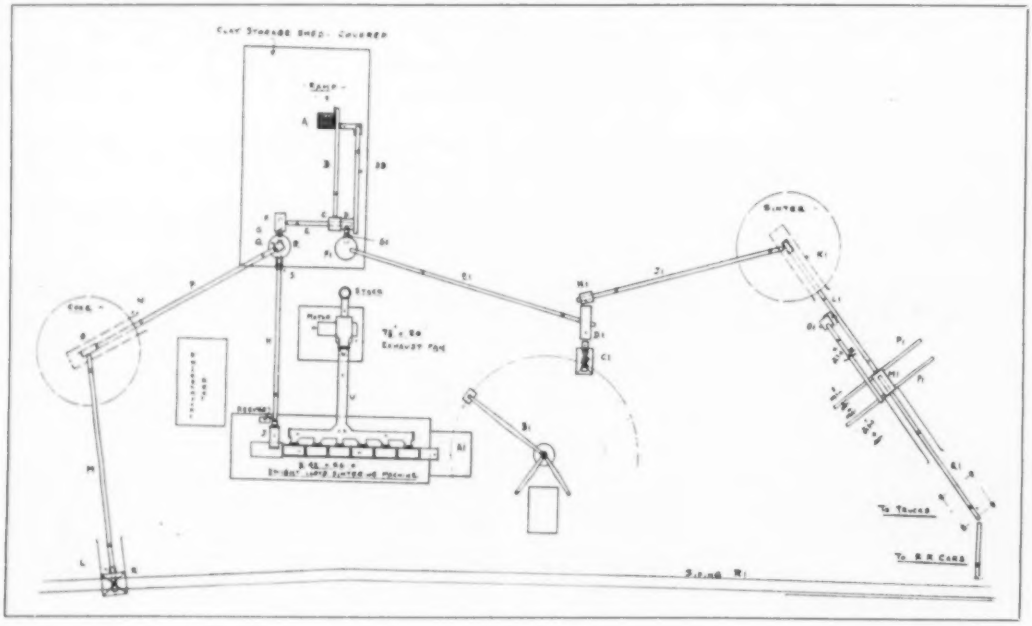
clay hopper. As clearly shown by the general arrangement drawing, the coke handling, storage, and processing circuit is set apart from the rest of the plant. Incoming coke is discharged from hopper-bottom cars into an undertrack hopper (unit "K"), and an inclined belt conveyor (unit "M") elevates and drops the material into an open storage pile over a recovery tunnel (unit "K"), and an inclined belt delivers the coke to an inclined belt conveyor which discharges into a modified hammermill, where it is crushed to minus ¼-in. before dropping into the hopper-bottom bin. A 24-in. feeder belt (unit "S"), arranged and driven in the same manner as the clay feeder belt, places the prepared coke on the collector belt. There is provision ahead of the hammermill in the coke processing circuit for by-passing minus ¼-in. material whenever there is enough of it to justify screening.

The control for the collector belt is located on the sintering machine operating floor, so that the operator can readily vary the rate of feed without changing the clay-returns-fuel ratio. The belt discharges into a Sinterite drum-type pelletizer mixer (unit "J") which is direct-connected to a 10-hp. U. S. Syncrogear motor. After thorough mixing, the clay and coke are discharged through a unique swingspout distributor, the drive linkage of which has adjustments for total amplitude of swing, and for left and right throw. It discharges the material into the feed hopper at the end of the sintering machine in such a way that the larger particles of unsintered returns roll down the pile and lodge next to the traveling grates. By adding a hopper grid or screen for which provision was made in the design, this hearth layer bed may be increased in depth to protect the grates from excess heat, or to reduce the volume of dust going to the fan.

The sintering machine is a Dwight-Lloyd Type EK-S unit which is 42 in. wide and 66 ft. long over the windbox section. It is driven by a 15-hp. U. S. Vari-Drive with a 3 to 1 ratio, the control shaft for which is extended to the operating floor so that the operator may adjust machine speed (i.e. sintering time) with minimum delay. Down-draft is provided by an angular double-inlet, bottom horizontal discharge Dwight-Lloyd high-pressure sintering fan located in a separate building adjacent to the sintering building. The 78-in. diameter by 20-in. wide fanwheel is driven through a Lovejoy flexible coupling by a 300-hp. Westinghouse motor. It is rated to handle 45,000 c.f.m. of gases at 250 deg. F. Starting is by means of a reduced-voltage manual compensator, and there is a damper at the fan inlet to permit starting without air load.

Gases from the various windboxes pass to the exhaust system through gated exhaust nipples, the suction in

Allen S. Johnson Jr., who designed the plant and now operates it, and Enoch A. Goodman Jr., one of the three partners in the venture, inspect some of the first sinter cake to be produced.



General layout of various production units in the new plant. Symbols on the items of equipment are used in the accompanying description.

each windbox section being controlled by the gates. Each windbox has a dust leg trap which may be emptied at any time without closing off the windbox or otherwise affecting the suction system. Due to the generous size of the collector pipe and exhaust pipe (unit "U"), a comparatively low gas velocity is maintained. For this reason it is believed that if experience dictates later installation of suction pipe dust legs, they will operate without changes in the suction system. Room has been provided between the fan and the sintering machine for future installation of a dust collector.

The coke content of the raw feed is ignited by means of two low-pressure light-oil Hauck venturi burners firing against pallet travel. These are housed in a 6-ft. long water-jacketed ignition hood at the feed end of the machine. Valves in the discharge line of the jacket are so arranged that the cooling water may be used in the pelletizer mixer or wasted. Thirty-five p.s.i. oil pressure is maintained in the fuel system by means of a circulating oil pump and a relief valve. Air is supplied to the system by a 5-hp. blower at about 16 ounces pressure.

The bed of material rides on 24- by 42-in. cast-iron pallets fitted with Mallix finger-type grate bars which have ¼- by 24-in. longitudinal openings amounting to about 14 percent of the total pallet area. Steel sprockets meshing with steel drive rollers push the pallets, which are carried on 70-lb. rails, under the feed hopper and ignition furnace, and over the windboxes. The pallets discharge at the far end of the machine by passing in an inverted position to the lower track, where they pass through formed guides to the drive sprockets. A drop-track safety device at the point of sprocket entry operates cut-off switches to prevent damage in the event that obstructions do not allow proper meshing between the sprocket teeth and the pallet drive rollers.

All controls for the sintering machine are located on a small operating platform at the feed end. Feed volume is controlled by the variable-speed drive on the collecting conveyor, and sintering time can be varied by adjusting the speed of the machine. Proportions of clay-returns-fuel are set at the bin gates.

The sinter cake is discharged from the machine into an open pit (unit "A-1") from which it is recovered by a Clyde Iron Works stiff-leg derrick (unit "B-1") equipped with a 2½-cu. yd. clamshell. The hot material is placed in storage piles within the swing radius of the stiff-leg and permitted to cool before final processing. Later it is picked up by the clamshell and placed in a small steel hopper mounted over a 3- by 12-ft. Pioneer apron feeder (unit "C-1"), which discharges into a 5- by 10-ft. Telsmith trommel screen (unit "D-1").

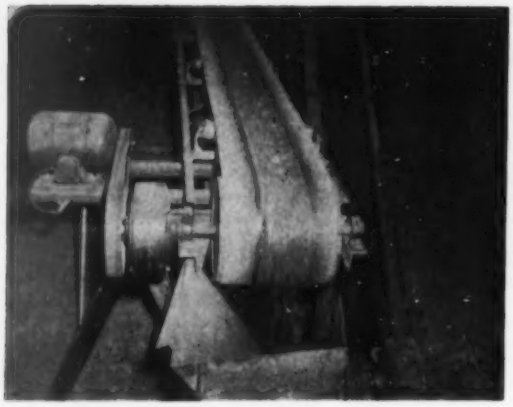
The trommel screens out minus ⅝-in. material, consisting of unsintered fines and a sufficient quantity of broken sinter to provide returns and grate dressing for the sintering machine. This material drops onto an 18-in. inclined belt conveyor which discharges into a small bin (unit "F-1") located in the clay storage shed. The returns are then fed to the clay belt by means of a Syntron vibrating feeder, thus becoming an integral component of the charge. In addition to providing grate dressing for the sintering machine, the returns assist in preventing the raw clay from compacting in the surge feed hopper ahead of the collector belt.

Oversize sintered material from the trommel screen is fed to a 10- by 36-in. Cedarapids jaw crusher. The crushed product drops onto a 24-in. inclined belt which discharges into a surge pile over a reclaiming tunnel. Another 24-in. inclined belt conveys the material from the surge pile to a 4- by 12-ft. double-deck Seco vibrating screen, which is mounted on wide bulkheads to form

Left: A view of the covered storage building, where excessively wet material can be dried before it is fed to the sintering plant in the background.

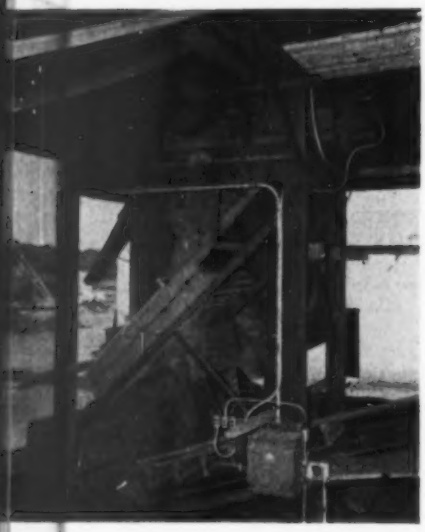
Below, left: Raw clay is dug from an open pit and trucked to the storage building.

Below: Discharging clay into the primary feed hopper located in the storage building.



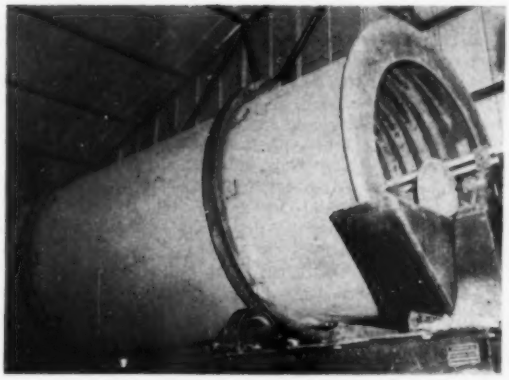
The clay is crushed in a hammermill, and oversize material is returned to the primary feed conveyor on the belt at the left. Most of the conveyors in the plant are driven by torque-arm-type reducers mounted directly on the head shafts.

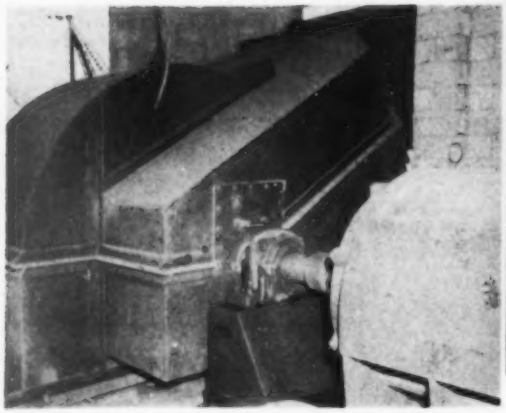
A. Starling Johnson, president of the Johnson Concrete Company of Salisbury, is one of the principals in the lightweight aggregate venture.



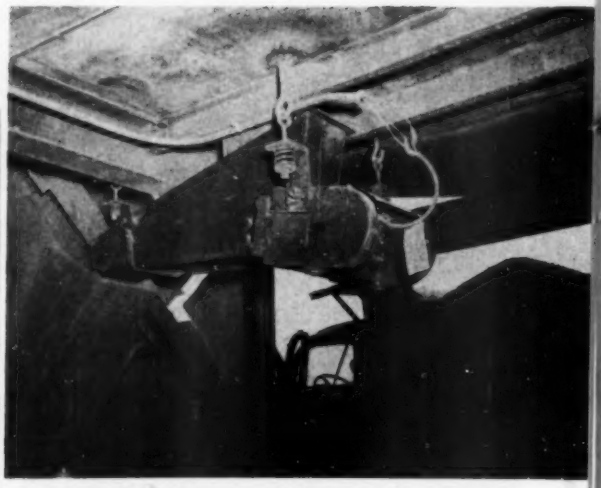
Left: A view of the crushing and screening circuit for raw clay. The raw feed is sized by a piano-wire clay screen.

Right: The drum-type pelletizer mixer in which the raw materials are thoroughly mixed with water just before they are fed to the sintering machine.

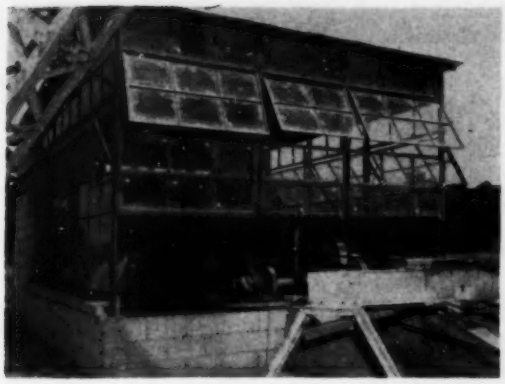




Down-draft for the sintering process is provided by this high-pressure fan. It is rated to handle 45,000 c.f.m. of gases at 250 deg. F.



A small quantity of fine, broken sinter is blended with the raw feed to provide grate dressing for the sintering machine. This material is placed on one of the belt conveyors in the storage shed by the vibrating feeder pictured here.



Below: A view of the control house from which the stiff-leg derrick is operated.

Right: As the first stage of processing, the sintered material is placed in a hopper over an apron feeder which discharges in a 5- by 10-ft. trommel screen.

division walls for the various finished sizes of material. A small roll crusher (unit "O-1") operates in closed circuit with the screen to reduce all oversize (plus 7/16-in.) material.

A reclaiming tunnel with feed gates permits the various sizes to be blended or loaded separately into railway cars or trucks. There is a 1,150-ft. siding which can accommodate ten empty cars between the coke track hopper and the loading hopper, and ten full cars beyond the point at which the finished product is loaded. The plant is located on the main line of the Southern Railroad.

Conveyor idlers and pulleys throughout most of the Tuff-Lite plant were supplied by Continental Gin. Most of the drivers are electric motors V-belt connected to American torque-arm-type reducers mounted directly on the shafts of the driven units. Power is supplied at 2,300 volts by the Duke Power Company. Two transformers located on the property provide 440/220-volt, 60-cycle, 3-phase, 900 k-v.a. of power, only 65 percent of which is used at present. Industrial water for the ignition furnace water jacket is pumped from a stream located about 3,000 ft. from the plant.

Sintering operations will eventually be maintained on a three-shift schedule, although one of the advantages of the Dwight-Lloyd system is said to be that the machine can be operated intermittently without loss of efficiency due to shutting down and starting up. Mining is normally on a one-shift basis, the trucks feeding the raw clay directly into the processing circuit when conditions permit. When the material from the pit is too wet, it is placed in the covered storage shed until sufficiently dried. The clay feeder is supplied from the storage piles by an Allis-Chalmers HD-5 front-end loader. Depending on loading activity and other variable factors, the stiff-leg derrick operates on a full- or part-shift basis.

The principals in the Carolina Tuff-Lite Co. are A. Starling Johnson, Allen S. Johnson Jr., and Enoch A. Goodman Jr. The Johnsons, father and son, own and operate the Johnson Concrete Company at Salisbury, producing 1,200 to 1,500 lineal feet of concrete masonry units per day. A small portion of the lightweight aggregate produced at the new plant will be used in blocks for the local market. Mr. Goodman operates the B. V. Hedrick Gravel & Sand Company at Lilesville, the Cumberland Gravel & Sand Company at Fayetteville, and the Grove Stone Gravel & Sand Company at Asheville.

Design and construction of the sintering plant were carried out under the personal supervision of Allen S. Johnson Jr., who is also in full charge of operations.

Asbestos Output Reaches High of 42,918 Tons in 1949

Production of asbestos in the United States reached a record of 42,918 short tons in 1949, or 15 percent more than in 1948, according to reports from producers to the United States Bureau of Mines.

Chrysotile was produced in Vermont and Arizona, and some development work was reported in California. Amphibole output was reported from California, Georgia, and Oregon.

Although demand in the United States was at a high level, imports from foreign sources were lower than in the record year of 1948 because of the strike in Canada. Canada is our principal supplier of chrysotile; small quantities were imported from Southern Rhodesia and Russia. South Africa supplied all the amosite and nearly all of the crocidolite consumed in the United States.

Kentucky Fluorite Report Issued by Mines Bureau

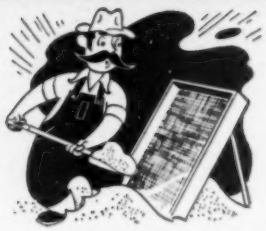
A diamond-drilling investigation of fluorite deposits in Crittenden and Livingston counties, Ky., conducted by the U. S. Bureau of Mines during the war years of 1943 and 1944, is described in a project report published recently.

Used principally in the production of steel, fluorite is also employed in the manufacture of other important products, including hydrofluoric acid, glass, enamels, and ferro-alloys.

The Bureau of Mines explored four of the five properties of the Babb fault zone of southwestern Kentucky by diamond-drilling 28 holes, totaling more than 8,177 feet. Logs of the drilling operations are given in the report, which also gives data on the Delhi-Babb mine—a property which was not included in the current study.

Free copies of Report of Investigations 4677, *Investigation of Fluorite Deposits of Babb Vein System, Crittenden and Livingston Counties, Ky.*, by A. S. Swanson and X. R. Starnes, may be obtained from the Publications Distribution Section of the Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

Screenings



by William M. Avery

JUDGING from the press clippings that pass over our desk in a steady stream, the pit and quarry industries are currently involved in more than their fair share of legal embroilments. In New Jersey a million-dollar informer's suit has been brought against a number of producers of sand and gravel and crushed stone, accusing them of submitting rigged bids on materials used for W.P.A. projects in 1935 and 1936. It runs in our mind that back in that era it was still legal, although somewhat difficult, to show a profit on transactions with the federal government. No doubt, they've decided to make the new rules retroactive.

Then there's the knock-down and drag-out fracas at El Sobrante, Calif. "Quarry Men and Residents Set for Showdown!" scream banner headlines in the local paper. We felt just a little let down when we read on and discovered that five housewives were protesting against the granting of permits to operate sand and gravel pits near their homes.

At Madera, Calif., the operators of a granite quarry have filed a $59,000 damage suit against the Sigma Alpha Epsilon Fraternity and 66 members of its Fresno chapter. Seems the lads held an unauthorized initiation ceremony on the plaintiff's property, in the course of which they knocked hell out of a derrick and winch, and destroyed air compressors, water pumps, jackhammers and other equipment. Quarry machinery, obviously, is not designed to withstand the wear and tear of a fraternity initiation. We're just a little curious to know how the initiates weathered the ceremony.

Hand That Cradles the Rock

ONE of the nation's relatively few women truck drivers broke into the news recently when her foreman described her as one of the best truck drivers he's ever seen in action. Warming up to his subject, (an affectionate chap, this) he went on to say: "She handles a truck loaded with eight tons of boulders better than most gals handle a baby carriage."

From our limited but memorable experience in dodging baby carriages, this seems to us a bit like damning with faint praise. Anyway, who ever said that an eight-pound baby isn't both potentially and actually a considerably greater destructive force than any old truckload of boulders?

Pointed Suggestion

FROM Hollywood comes a report that Lana Turner's foot prints have been preserved in concrete at

Grauman's Chinese theater. Most of the time it's probably a good thing to stick to tradition, but for Lana we think the rules should have been altered at one or two salient points.

Whew!

AMONG the boatload or so of newspaper descriptions we've received of the P.C.A.'s new laboratories, one calls attention to the "awe-inspiring contrast between a testing machine that can exert one million pounds of pressure and a balance which is sensitive enough to weigh the dust from a butterfly's wing".

We didn't think this half as awe-inspiring as the implied possibility that the association might be about to recommend the inclusion of butterfly wing dust in portland cement, a movement which would unquestionably bring the industry into conflict, with the insect division of the S.P.C.A. A phone call quickly established that the allusion to butterfly wing dust was purely rhetorical, and that P.C.A. has no plans at the moment for incorporating this rare material in portland cement.

Sermons in Stones

WE UNDERSTAND that a seven-ton limestone statue of Steve Canyon, comic strip character, will soon be unveiled in the public square at Bedford, Ind. Ultimately it will be flown, escorted by planes of the Liberty Bell Squadron, to Idaho Springs, Colo., where it will be ceremoniously enshrined on a main highway leading into the Rocky Mountains.

No doubt we're just a little bit obtuse, but no amount of celebration suggests even the remotest excuse for so much hullabaloo about a comic strip character. Maybe it's because we don't like pigeons.

What, No Fish?

FROM Science Service via the *New York Times* we have just learned that a cubic mile of sea water contains 117,000,000 tons of common salt, 6,000,000 tons of magnesia, 4,000,000 tons of potash, 3,000,000 tons of bromine, 2,000,000 tons of borate, 2,200 tons of iodine, 900 tons of iron, 450 tons of copper, 70 tons of uranium, 15 tons of silver and an unspecified chunk of gold. If they were just looking for out-size numbers, we wonder why the pikers didn't base their calculations on a cubic light-year of sea water.

Giving the Bird to the Birds

ONE of our readers wrote in not long ago requesting information about a supersonic whistle designed to keep birds out of mill buildings and warehouses. Sure enough, we discovered that an outfit in Cambridge, Mass., manufactures a special sound generator for this occult purpose.

Move over, Mr. Anthony, you've got competition!

Quarrying with Diamond Drills*

PROBABLY everybody engaged in diamond drilling has heard of the atomic bomb and can discuss it; but only a few will recall that the equation $E = mc^2$ made it possible; and that the theory of relativity can be applied to other and more simple projects. Most people concerned with drilling are conversant with quarrying, but when they are thinking of it, they are unlikely to do so in terms of underground blast-hole drilling. A classic example of quarrying with diamond drills, the Finlayson Rock Cut, was publicized several years ago; and some attempts were made to develop the technique at that time. Now it is almost forgotten.

One of the difficulties has been that the average quarry face is a poor set-up for diamond drilling until it has been cleaned off. Benching with wagon drills (Fig. 1) leaves shallow faces, too low for diamond drills to show to advantage; and the intense fracturing caused by backbreak from previous blasting increases diamond bit costs beyond reason. Churn drilling from a greater height leaves an equally ragged face, and the standard arrangement of large holes on wide centers causes even more severe backbreak and fracturing. Consequently the drilling of the first few rows of holes is expensive, and may only give an indication of what can ultimately be achieved. Neither the driller nor the equipment manufacturer could reasonably stand the entire cost of such demonstration; thus there has been a problem of getting the quarry owners interested to the point of experimenting. The first showing is almost bound to be poor, and their enthusiasm is apt to wane.

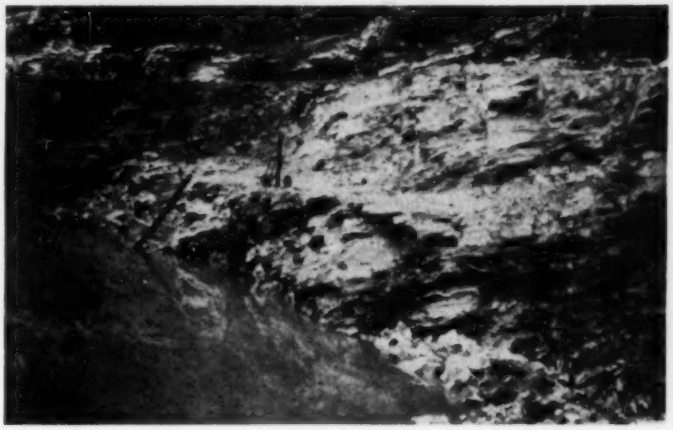


Figure 1

Generally speaking, explosives engineers and even explosives manufacturers have not been in a position to help, because it would be difficult for them to guarantee proper breaking and fragmentation on the first shot or a clean break over the entire face; or that additional wagon drill holes would not be necessary to break out the toe after the main blast. And, as a badly blasted toe would be covered with rock from above, this trouble would not be apparent until after most of the mucking operation was completed.

Quarrying is usually operated on a somewhat narrow margin of profit, and because the established method of blasting in any profitable operation obviously works out economically, there has been reluctance on the part of management to try any experiments; and on the part of the explosive staffs to advocate a change and take all the responsibility. Yet the explosives engineer is the key man in the future of quarrying with diamond drills.

Once the spacing and size of the holes has been decided, the drilling operation is relatively simple. The set-ups may be bad, and they could be dangerous when only one row of holes is to be drilled at a time. In the case of the Finlayson Cut the holes were all drilled ahead, and because of uneven terrain elaborate timbering was used. This gave the drillers good working conditions, but was doubtless costly. In limestone formations the surface rock is apt to be very rough (Fig. 2); but in extreme cases this can be somewhat leveled off by drilling and blasting a few pop holes to a point where the drills can be moved around without undue expense. After the first few rows have been blasted and the face has been cleaned off, conditions become more nearly ideal.

The holes will vary from 50 ft. to 250 ft. in depth, according to the height of the faces in various quarries; and this is an easy range for a diamond drill. Core samples will not be required; consequently even in cases where solid bits cannot be used (and they will be few), time need not be expended in careful recovery of cores. The operation should be as rapid as the bits will

*By Patrick Adamson, Wheel Trueing Tool Co., Detroit, Mich.

Figure 2

stand, with an economical balance maintained between bit cost and labor cost.

If this balance is achieved and the cost of drilling does not fall within the limits of a chart similar to that shown below (Fig. 6), it is likely that diamond drilling is not the answer.

The rock must be of medium hardness, and it must be solid. Both churn and wagon drilling are expensive in formations like trap rock and diorite. Some granites call for diamond drills and some do not; it depends on brittleness and grain size. In limestone the cuttings need to be washed away because they tend to clot and form a paste. This gives a diamond drill an advantage because the circulating fluid does just that; and it also happens that limestone is one of the media in which the present designs of diamond drilling

Figure 3

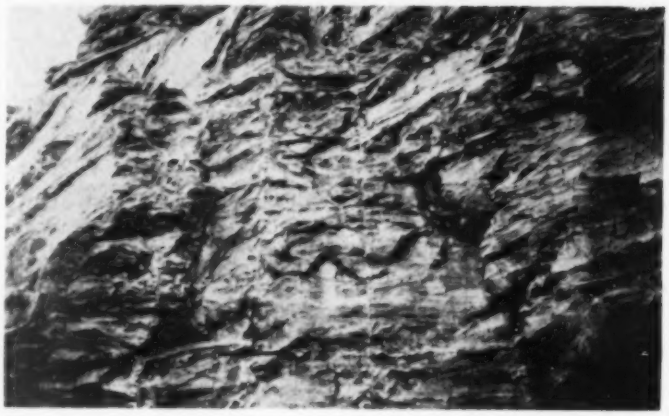


Figure 4

machines and bits show their maximum efficiency. Diamond bits have a short life in fractured rocks, but in these formations other types of bits do well, as half their work is already done for them.

There has been, of course, some successful diamond drilling done in quarries in the past, but each condition had to be judged on its own. Enough has not been done in varying conditions by any one operator to enable safe rules to be worked out and made available to the industry. It would be helpful if detailed records were kept in all cases and eventually collated and published.

It is strongly emphasized that the terrain be properly surveyed and at least the first four or five series of holes blueprinted. During the first part of the operation, which must consist of preparing and cleaning the face, some variations of spacing and loading can be tested because no two operations will be precisely similar. This is the same problem that confronts mining engineers when they start a long blast-hole drilling program underground. In underground mining, if development up to this point has been by conventional methods such as shrinkage stopping, it is expensive to change methods and lay out a development program that will make full use of diamond drills. However, when conditions are right, the initial expense is more than recovered by later economy of cost per ton of ore broken. If a new ore body is developed by diamond drills from the beginning, much of the expense of such a changeover is saved; but some experimenting with spacing, burden, length, size of holes, and required strength of explosives will go on before the ultimate economy is reached.

This is all generally true of quarrying by diamond drilling. However, I do not know of a single quarry that started off on the premise that long blast hole methods, using diamond drills, would be the cheapest way to operate.

The problem, then, is comparable to one solved by an already known and proven technique, but, as was the case in diamond drilling in the oil fields, there is not much overlapping of technical thinking between the people engaged in these two diverse operations.

Compared with other methods, both drilling and dynamite costs may be high. However, the practical operator is primarily concerned with

Figure 5

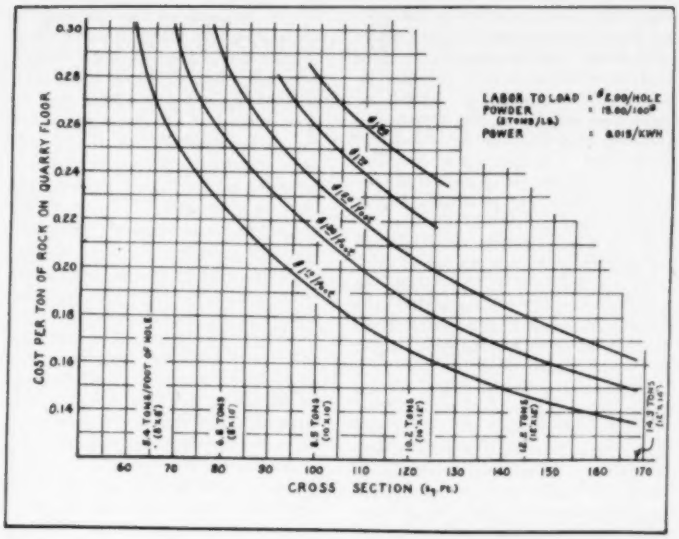


Figure 6

cost per ton on the quarry floor, and not with details.

Moreover, cost per ton on the quarry floor must include all secondary blasting. This is important because it is in consideration of this factor that diamond drilling can catch up to and pass competitive methods.

Before going on to describe a successful application of diamond drilling (Fig. 3), there are certain factors which should be understood. As in underground mining, diamond drill holes can be used to recover ore or rock which would otherwise be inaccessible, or too dangerous to mine. Diamond drill holes have a smooth uniform bore which is ideal for loading with explosives. They can be kept straight and controlled so that a uniform burden is obtained. More powerful and efficient drilling machines can be used than in underground drilling, where weight is more of a factor; this will increase drilling speed. Moves along a row of vertical holes are rapid and easily accomplished. The rock breaks clean, leaving half the drill hole showing on the face (Fig. 4), and there is no tendency to backbreak. There is minimum vibration in shooting many small holes which prevents rock movements; this is also important in built-up areas. Full use can be made of recent developments in explosives and methods of shooting. Fragmentation can be controlled to eliminate nearly all secondary blasting.

The Campbell Limestone Company operates a quarry at Gaffney, S. C., which is situated close to a girls' school. Excellent deposits of limestone extend under their playing field, and within a stone's throw of the school buildings. The school authorities (who are the landlords of the property) objected to the encroachment of unwarranted vibrations upon their charges; but the company would have been faced with a serious loss of profit had they ceased operations at the school end of the quarry. It was therefore decided to try a different method of blasting, so that the operation could be continued without creating undue disturbance.

Robert Campbell and J. P. Jennings, both of the Southeastern Drilling Company, Asheville, N. C., and E. M. Murray of the Atlas Powder Company got together on this project and decided to try a row of diamond drill holes coupled with a blasting technique in which they would use the Rockmaster blasting system developed by Atlas. The usual difficulties were present, because it looked as if two or three rows of holes would have to be shot before the efficiency of the method could be determined. Another consideration was that the rock dips toward the quarry, so that the face would have to be kept slightly concave. This lateral arching prevents possible forward movement of the whole body of rock into the quarry. It was particularly important because a mud-filled fault zone lies back of the operation.

The original techniques used have already been much improved, but in this particular case they gave hope of success from the very start. At the present time a 115-ft. face is being drilled and blasted successfully. Owing to the nature of the formation, only single rows of holes are being drilled at a time because there is movement of the rock after each blast. The holes are drilled in series of 10 or 12 holes, moving around the concave face so that the arch is never disturbed or straightened out. Two diamond drills are set back from the face some 8 ft. and holes are drilled 10 ft. apart (Fig. 5). It has been found that for maximum efficiency the burden and spacing of the holes should not be equal, but they can be varied within limits to suit the particular drilling conditions, for example, 10 ft. by 6.5 ft. rather than 8 ft. by 8 ft. AX holes 1-57/64 in. in diameter are drilled at the rate of one complete hole per shift, plus a move to the next location. This may seem to be a good rate of penetration for AX coring bits, but it is the opinion of all concerned that this is nowhere near the limit; and if the holes can be kept perfectly straight with non-coring bits, there is no doubt that the overall penetration rate can be materially increased. It can even be increased with coring bits.

While I was watching a series of holes being drilled, the driller put on a standard Truco AX core bit. After it had drilled 10 ft., and he was starting his next run, I asked him to run the 22HD machine all out in high gear (1850 r.p.m.) and give it all the feed it would take. When I saw some raised eyebrows, I explained that after spending a good many years building bits up, I wanted to break one down—just once. Having seen many diamond bits perform in limestone, I wasn't worrying much about a breakdown. The penetration speed was 30 in. in 50 seconds. This is not a record, but it isn't bad; and it means that 20 in. per minute at 1450 r.p.m. is the target to aim at, so that neither the bits nor the machines are overloaded. BX solid bits have drilled 100 ft. in one hour in Missouri limestone. It is just a question of balancing bit cost and labor cost to get the greatest overall economy.

At first 1¾-in. dynamite was used, but this has now been reduced to 1½-in. diameter, and the loading time was cut 50 percent in doing so. The holes are loaded with Atlas 75 percent Giant Gel by means of sectional aluminum rods which are jointed at 10-ft. intervals. Shooting is by means of Rockmaster electric

controlled split-second delay. At 100-ft. depth the holes are loaded alternately with No. 0 and No. 2 detonators, a procedure which causes instantaneous explosion on the zero holes and a 25 milli-second delay on the alternate holes. At a depth of 24 ft. Rockmaster "A" and "B" detonators are alternated, but the numbered type will shortly be substituted. The strength of the explosive has been varied up and down the holes, but it now appears as if straight loading with 75 percent gelatin dynamite will produce the most effective blast. In a recent shot 1,300 lbs. of dynamite were used to break 8,000 tons of rock. There was practically no noise and very little vibration. The face moved forward a few feet, seemed to unfold in the air, and fell to the quarry floor. The throw was not over 20 to 25 ft. This control was due to correct burden and straight holes. If you let the holes bend out at the toe, the rock fragments will take off over the quarry floor like a covey of quail. If they bend too far inward, the toe won't break out. At a rough estimate 85 percent of the rock blasted was evenly fragmented to a perfect workable size. The exception was provided by two or three large chunks which sloughed off from an overhanging part of the face which was faulted; and these larger pieces were brought down by design and not by accident.

Although it is obvious that further improvements will be made in the future, the financial part of the proceedings are of interest. Taking a unit of 100 as a total cost up to the point of shipping, the diamond drilling cost 18½ percent, the dynamite cost 3½ percent, and the secondary blasting, which used to cost 11 percent, now costs less than 5 percent. This leaves a more comfortable margin than is usual to cover the subsequent operations. Following up the results already obtained, it is now proposed to set up a diamond drilling program at the other end of the quarry because experience has already shown that the operation will be economical. There is no inducement, other than economy, to continue that part of the operations with diamond drills. Careful cost and time checks have been kept and as a result the following table (Fig. 6) has been worked out for similar conditions in limestone. Provided that proper fragmentation can be obtained with a reasonable burden and spacing of diamond drill holes, the amount of money that can be spent in diamond drilling is in direct relation to the cost per ton for which rock must be deposited on the quarry floor. The quarry owner knows what price per ton would show him a saving; the explosives engineer can figure the spacing, burden, and explosive to be used; and it is then up to the diamond drill operator to decide whether he can operate profitably at the cost per foot which will give this result. It should not be assumed that all quarrying operations are susceptible to diamond drilling, but the method would undoubtedly save money in a great many operations at present being conducted with wagon drills and churn drills.

It has not been the object of this paper to go into complete details of the operations of the Campbell Limestone Company, because exactly the same conditions are unlikely to occur again; but in general the operation is a straightforward limestone quarrying job, and what Mr. Campbell and the Southeastern Diamond Drilling Company have been able to accomplish can certainly be done in many other places. There is little doubt that all the preliminary difficulties I have mentioned, and probably many others, will be encountered as each separate operation is approached; but that should only add to the interest and determination of the industry to establish itself in a new field.

Quarry owners will invariably want to compare the cost of 6-in. diamond drill holes with 6-in. churn drill holes; but the two methods should never be compared in those or larger diameters. On the diamond drill side, a greater number of small holes, where the drill cost can be kept low, is more likely to make a showing in the overall cost picture; but they must be properly loaded and shot. The operator, the driller, and the explosives engineer must cooperate closely; and of the three the explosives engineer is really the key man. Maybe we have all been overlooking a bet.

Great Lakes Carbon Co.

(*From page* 86)

ables it to be traced to the point of use where its on-the-job performance may easily be checked against quality control procedures at the plant, and the two can be coordinated.

There is a well-equipped laboratory at the Torrance plant. Basic research, however, is conducted on a broad scale at its main research laboratory in Morton Grove, Ill.

Jay Mayhew is operations manager and Fred E. Brose is Torrance plant superintendent.

On June 9, 1950, the company held an all-day open house at the plant, entertaining over 700 architects, engineers, contractors, and building-supply dealers from all over southern California. Refreshments were on tap throughout the day for the visitors, who were conducted

(*Continued on page* 98)

• Harry F. Utley, Pit and Quarry, Walter Lenhart, Rock Products, and David Reese, Wall Street Journal, listening to R. L. Cornish, Great Lakes Carbon Corp., describing crude perlite ore.

1,000 Tons of Crushed Stone Taken Daily from Misplaced Ledge

another ON THE SPOT report

PROBABLY more lines have been written about the Atchison (Kan.) limestone mine owned by Kerford Quarry Company than any other in the United States—not because of the unusualness of the mining operation, but because the worked-out section of this mine has been used by the government to store surplus eggs. Of more direct interest to the nonmetallic minerals industries is the quarrying operation carried on by this company at a new site near Amazonia, Mo.

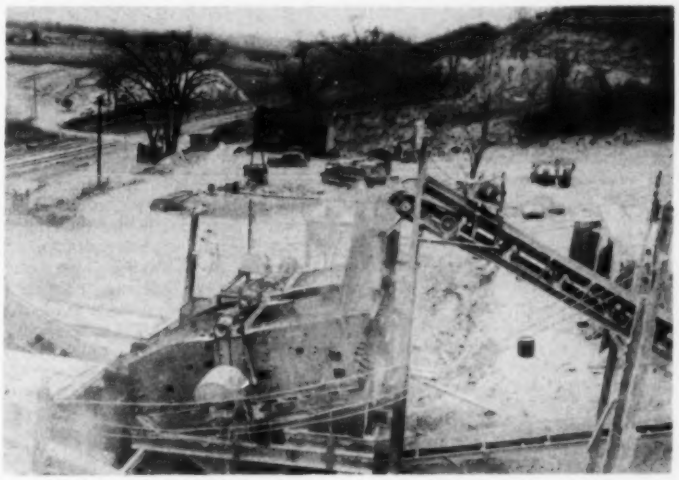
Kerford Quarries was founded in 1886 by George W. Kerford. Upon his death in 1914, his two oldest sons, George H. Kerford and Lloyd Kerford assumed active management of the company. Commercial stone operations at Amazonia were started as recently as September, 1948, under the direction of Lloyd Kerford Jr., grandson of the founder of the company.

The deposit being worked at Amazonia is commonly referred to as the "misplaced ledge," so named because the outcropping at this quarry averages from 13 to 15 ft. deep, whereas the same ledge in other areas never exceeds 5 ft. in depth. It was discovered back in 1934, and at that time small quantities were recovered and shipped to a nearby river project. Since the rock is acceptable as concrete aggregate and since there is very little suitable concrete stone in this area, the deposit is considered a valuable one.

Overburden is rather heavy here, ranging from 0 to 70 ft., with an average depth of about 30 ft. It is removed with Caterpillar D8 tractor pulling a LaPlante Choate 14-cu. yd. scraper. Because of the tremendous tonnages of dirt that have to be removed, stripping is just about a year-around operation.

The stone is worked in two benches; the first, which is 15 ft. deep, supplies stone for concrete aggregate; and the second, 20 ft. deep, supplies aggregate for bituminous and road mixes. The first bench is drilled in two stages, using a 2⅛-in. starter bit and finishing with a 2-in. bit; the 20 ft. ledge is drilled in three stages, with 2⅛-in., 2-in., and 1⅞-in. bits. All drilling is done with Gardner-Denver wagon drills mounted on trucks for increased portability. Air is supplied with a 500 c.f.m. Gardner-Denver compressor and an Ingersoll-Rand compressor of the same capacity. What little secondary drilling is needed is done with jackhammers.

In order to prevent the contamination of shot stone by rain, some



• A view of the first screening operation at the Kerford Quarries, showing the pair of three-deck screens.

• Lloyd Kerford Jr. is in charge of the operations at Amazonia. He is a grandson of the founder of the company, who started the business back in 1886.

• Below: Loading operations at the Amazonia, Mo., quarry of the Kerford Quarry Co. Each machine will load about 150 tons of stone per hour.

• Because of the vast tonnages involved, stripping is a year-round operation. Here is one of the tractor-scraper units.

• Right: About 98 percent of the production is shipped by rail. Cars are loaded with belt conveyor and chute as shown above.

shooting is done every day. The holes are loaded with 37 percent Powertol C, an Illinois Powder product, and detonated with delayed action caps. The loose stone is loaded with two Traxcavators mounted on Caterpillar D7 tractors. Each machine will load about 150 t.p.h. Ordinarily four 8-cu. yd. quarry trucks, two Ward LaFrance, a Federal, and a Mack are employed to haul the stone from the working face to the crushing and screening plant.

The trucks deliver the stone to a Pioneer 40-in. by 14-ft. clutch-controlled feeder which discharges into a Pioneer 30- by 42-in. jaw crusher. Both the crusher and feeder are driven off a 200-hp. Allis-Chalmers slip ring motor. The crusher discharge is split into two streams, each one of which is passed over one of two 5- by 12-ft. Deister Machine Company 3-deck screens. Plus 1⅝-in. material off the top decks and plus 5/16-in. material rejected off the middle decks is conveyed by gravity to a 24- by 40-in. Pioneer 3-roll crusher, which gives a 2-stage reduction in one machine. Each roll is independently powered with a 150-hp. electric motor. The final product from this crusher, 80 to 90 percent of which passes a 1⅛-in. mesh screen, is repassed over the scalping screens.

Plus No. 8 mesh material off the bottom deck is taken out of the circuit and sent via a 30-in. belt conveyor 4- by 12-ft. Deister Machine Co. 3-deck screen. The top deck of this screen is covered with a 1-in. cloth, the middle deck with ½-in. cloth, and the bottom with 5/16-in. mesh cloth. Minus No. 8-mesh material is dropped into a bin and sold as agstone. Approximately 16 percent of the company's production of 1100 tons per day is in the minus No. 8-mesh range.

All of the equipment in the crushing and screening plant is driven off electric motors. Commercial power is stepped down to 440 volts with six new transformers—three 150 kv.-a. units and three 37.5 kv.-a. units. With the present facilities, the total connected load is in the neighborhood of 610 hp.

About 98 percent of the company's production is shipped by rail. Open-top cars are loaded directly by belt conveyor and chute. (See cut).

Great Lakes Carbon Co.

(*From page 96*)

through the plant and permitted to witness many demonstrations of the mixing, application, and placing of Permalite plaster and concrete.

Earlier in its history, Great Lakes Carbon Corp. was engaged primarily in producing and marketing coal, petroleum coke, and carbon electrodes in the East and Middle West. In 1944 it entered the diatomaceous-earth industry through acquisition of the Dicalite Co., with deposits and plants at Walteria, Calif., Lompoc, Calif., and Terrebonne, Ore. Shortly thereafter it purchased additional reserves and plants at Basalt, Nev., and Kittitas, Wash. In 1945 the company went into the rock-wool business on a large scale with the erection of plants at Easton, Pa., Youngstown, O., and Argo, Ill.

National Standards Bureau Circular States Test Policy

A new circular, *Testing by the National Bureau of Standards*, has just been published which fully describes the Bureau's test policy, presents general information on testing, and lists fees for most of the test work that is done.

The National Bureau of Standards does not compete with qualified commercial testing laboratories, nor does it have the authorization, funds, or facilities to do general testing for the public. Fees listed in the new circular include those for tests on electrical standards and instruments; standards of length, mass, and time; pyrometers; fuels; radioactive standards; mechanical instruments; and optical instruments.

National Bureau of Standards Circular C483 is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 25 cents a copy. Remittances from foreign countries should be in United States exchange and should include an additional sum of one-third the publication price to cover the cost of mailing.

Employee-Rating Methods Explained in New Handbook

How to rate subordinates and how to evaluate other men's ratings of those they supervise are explained in *Rating Employee and Supervisory Performance*, a manual of merit-rating techniques just published by the American Management Association.

Rating Employee and Supervisory Performance was compiled by M. Joseph Dooher, A.M.A.'s editor, and his associate editor, Vivienne Marquis. It is available directly from American Management Association, Publication Service Department, 330 West 42nd Street, New York City 18, at $3.75 per copy. It may also be ordered through booksellers.

Hydraulicking Methods Used in New Aggregate Operation

J. N. Blackburn of Johnson County has recently undertaken a sand-and-gravel operation on Sidney Branch, 4 miles southwest of Mountain City, Tenn. The operation is unique in that the material, a brecciated quartzite, is mined by hydraulic methods and carried to the washing plant by a sluice line.

About 25 percent of the washed product is building sand and about 40 percent is in sizes suitable for oil chat.

obituaries

JOHN REYNOLDS MORRON, 82, former president of the Atlas Portland Cement Co., died on June 25 in Littleton, N. H.

In 1910 Mr. Morron became president of the Atlas Portland Cement Company, a post he held until 1929. Although retired from active business, he maintained an office at 25 Broadway, New York, and was a director of many financial and industrial enterprises, including the First National Bank of New York, the Baltimore & Ohio Railroad, Pullman, Inc., and the International Rubber Co.

DANIEL C. HICKEY, formerly chief engineer of the General Crushed Stone Company, Easton, Pa., died on July 5. He had retired in April, 1948, after having served in this post since 1930.

MAX LEVERETT CAUDILL, operator of the St. Paul Sand and Gravel Company, St. Paul, Minn., was drowned on June 23 when he was accidentally plunged into a North Loup River sand pit. He lost his balance and fell into the stream while trying to clear a clogged gravel pump. Although a companion secured help from the St. Paul fire department, and artificial respiration was applied, Mr. Caudill could not be resuscitated.

FRANK M. JENIFER, 72, vice-president and a director of the United States Potash Company, and president of the Pacific Coast Borax Company, died on May 25 at his home in the San Fernando Valley. He was 72 years of age.

LAWRENCE KENNEDY and PHILLIP STANFIELD, employees at the Ashgrove Lime and Portland Cement Company's plant near Chanute, Kan., were killed by a bolt of lightning which struck them as they were working in the quarry. Three other men working with them were knocked down but not seriously injured.

J. W. MOZLEY, who was the treasurer of the Atlanta Aggregate Company, Atlanta, Ga., died on June 18 after a brief illness. He was 59 years of age.

ARTHUR R. JOHNSON, 61, owner of the Larned Sand and Gravel Company, died on June 17 in Larned, Kan.

OSCAR MESHBERGER, former owner and manager of the Meshberger Brothers Stone Corporation of Berne, Ind., died unexpectedly at his home in Linn Grove, Ind., on May 4. Although Mr. Meshberger had been in poor health for some time, he had seemed much improved. Death was due to a heart seizure.

Mr. Meshberger founded his business in 1917 and had been the sole owner since January, 1946, when he and his brother dissolved partnership. He also owned the Blue Creek quarry. He was 56 years of age.

JOSEPH A. BAUMERT, 75, died on June 18, at Antwerp, N. Y. He was a director and secretary of the W. H. Loomis Talc Corporation in Governeur. Mr. Baumert also owned the Antwerp Light and Power Company and the Antwerp grist mill.

JAMES PEYTON BURGESS, 65, owner of the Oak Cliff Sand and Gravel Company for the last 30 years, died unexpectedly at his home in Dallas, Tex., on June 15. He was the son of pioneer Dallas County settlers.

WILLIAM EWART LUMB of Kingston, Ont., sales representative for the Canada Cement Company, died unexpectedly on June 8 in a Kingston hospital.

Trace Element Study Begun On Deposits of Missouri

The Missouri Limestone Producers Association's *News Letter* of July states that the Missouri trace element study, cooperatively sponsored by several state groups, was begun early in June.

Samples of material collected by participants in active and inactive quarries and in undeveloped limestone and dolomite deposits will be tested by the Agricultural chemistry department of the University of Missouri. Other cooperating bodies are the university's geology department and the soils department of the College of Agriculture.

News Letter states that the study will furnish limestone producers and other interested persons with the first comprehensive picture of Missouri's limestone and dolomite deposits; it adds that Missouri is the first state in the country to make a complete inventory of this kind.

Book of Standards 1949 Edition Now Available from A.S.T.M.

The 1949 Book of A.S.T.M. Standards, completed after many months of work, contains more than 1550 specifications, tests, definitions, and related data. Of particular interest to PIT AND QUARRY readers is Part 3, which covers cement, concrete, ceramics, thermal insulation, road and waterproofing materials, etc. The 1370-page section contains 340 standards.

A supplement will be issued for each part late in 1950. As a service with the 1949 Book of Standards, a complete Index to Standards will be furnished without additional charge. The latest 260-page index is now available.

Prices for the book are as follows: Parts 1, 5, and 6, $10 each; Parts 2, 3, and 4, $8 each; complete set, $54. Copies may be obtained from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.

1949 U. S. Salt Production Decreases by 5 Percent

Total salt production in 1949 receded more than 800,000 short tons from the 1948 production, or a decrease of 5 percent, according to reports from the U. S. Bureau of Mines.

Salt was produced in the following states: California, Kansas, Louisiana, Michigan, New Mexico, New York, Ohio, Oklahoma, Texas, Utah, Virginia, and West Virginia. In 1949, 59 percent of the total national output was contributed by Michigan, Ohio, and New York, as compared with 65 percent in 1948.

Me-Tex Mining Co. Plant Altered for New Operations

According to the *Engineering and Mining Journal*, the plant of the Me-Tex Mining Company, Inc., at Antonio, N. M., has been remodeled to process complex ores from 62 claims in the Hansonburg district (central New Mexico).

It is estimated that 200 tons of barite will be ground and sacked per day. Operations were also scheduled to start on jig concentrates from J. W. O'Brien's barite mill.

Lone Star 25th Anniversary Observed at Greencastle

On June 21 the 300 employees of the Lone Star Cement Company's plant at Greencastle, Ind., were feted by the company in observance of the 25th anniversary of its operation.

Watches were presented to 24 men who have been with the firm in the Greencastle plant for all of the 25 years. Members of the company's 25-year service club throughout the country now number well above 600.

personal mention

ARTHUR W. WORTHINGTON, president, and RALPH E. LARRY, vice-president, respectively, of the Pittsburgh Limestone Corporation, United States Steel Corporation subsidiary, recently retired from these offices after long periods of service in the organization. Concurrently with the announcement of their retirements, Benjamin F. Fairless, U. S. Steel Corporation president, revealed that IRVIN L. CLYMER had been elected to succeed Mr. Worthington.

Mr. Worthington began his career in engineering while serving as a construction engineer for the Pennsylvania Railroad. Later he joined the Koppers

I. L. Clymer

A. W. Worthington

Company as an engineer in charge of by-product coke plant construction. After serving in World War I in France he became assistant to the general manager of the Pittsburgh Limestone Corp. In 1930 he was promoted to general manager, and subsequently to vice-president, general manager, and president.

Mr. Larry was engaged in various positions in the coal, iron ore, and limestone mining industries prior to joining Pittsburgh Limestone in 1921. He was successively plant superintendent, supervisor of operations, engineering assistant to the general manager, supervisor of industrial relations, and assistant to the president. In 1947 he was elected vice-president, with headquarters at New Castle, Pa.

Mr. Clymer, who continues as president of the Michigan Limestone and Chemical Company and the Bradley Transportation Company (U. S. Steel subsidiaries) began his career as a draftsman and engineer with the Robins Conveying Belt Company. In 1926 he became associated with the Michigan Limestone and Chemical Company and the Bradley Transportation Company as chief engineer. He was elected vice-president of these companies in 1938, and a year later became president of both.

W. L. KEADY, former president of the United States Gypsum Company, became president and general manager of the Marathon Corporation on April 1. Marathon manufacturers food packaging materials at its plants in Wisconsin, Michigan, and Ontario, Canada.

When Mr. Keady resigned from the presidency of U. S. Gypsum last year, he had been associated with that firm for 25 years, serving as vice-president in charge of manufacturing, vice-president in charge of sales, and finally as president.

FRANK GARDNER has been promoted to the office of general manager of the South Dakota Cement Plant at Rapid City. The announcement was released by the South Dakota Cement Commission.

W. R. MCLENDON, who was formerly vice-president of field operations for the Halliburton Oil Well Cement Company, was recently elected president of the firm, to succeed John Halliburton, who is retiring after 17 years with the company.

LOGAN D. CAMPBELL was elected to succeed Mr. McLendon. Four new vice-presidents were named: R. R. EMERY, foreign operations and exports sales; W. D. OWSLEY, technical adviser to executive officers; W. B. TAPPER, electric well servicing; and GROVER KILGORE, sales and advertising.

General Refractories Company announces the appointment of HARRY T. GRAHAM as general sales manager of the company effective July 1, 1950. Mr. Graham has been in the employ of the company since 1937 with field sales assignments in the Chicago, Philadelphia and Pittsburgh district offices. Since September 1, 1949, he has been assistant general sales manager.

S. S. FURST, formerly general sales manager, has been appointed assistant to the vice-president in charge of sales.

DR. WILLIAM J. KNAPP, formerly associated with the University of Missouri School of Mines and Metallurgy, recently joined the engineering staff of the University of California at Los Angeles. Dr. Knapp will act as head of a new department of experiment and research in nonmetallic minerals and ceramic materials.

WILSON T. LUNDY, wo has been associated with the sulphur industry for more than 25 years, has retired from his duties as vice-president of the Freeport Sulphur Company. Mr. Lundy will continue to serve on the board of directors in an advisory capacity. He joined Freeport in 1923 and in 1930 was made general manager and a vice-president.

The appointment of JAY BARBEAU as traffic manager of Kaiser Gypsum has been announced by General Manager Claude Harper.

Mr. Barbeau was traffic agent with the Western Pacific Railroad in their San Francisco office and also served as San Francisco traffic representative of the New York, Chicago and St. Louis Railroad.

ALBERT E. BICKELL has been appointed assistant district sales manager of General Refractories Company's Pittsburgh office. Mr. Bickell was assigned to General Refractories' Buffalo sales office in February, 1937. In January of 1947 he was transferred to the Philadelphia office.

GEORGE L. PECK, who has been with the General Refractories Pittsburgh sales office since 1948, will replace Mr. Bickell in the Philadelphia office.

JAMES H. ACKERMAN, president of the Lawrence Portland Cement Company, has been elected a director of the McGraw-Hill Publishing and Book Companies.

JOHN V. BEALL was appointed Eastern secretary of the Mining Branch of the American Institute of Mining and Metallurgical Engineers, it was announced on May 22 by Edward H. Robie, secretary. Mr. Beall will retain his position as editor of *Mining Engineering Magazine*. Mr. Beall's office is at the New York headquarters of A.I.M.E.

W. A. FIPPS, formerly employed by the Murphy Lime Quarry of Marshfield, Mo., has recently taken charge of the Missouri Farmers' Association lime quarry, also in Marshfield.

PAUL J. KREMER of the Buffalo Slag Company, Buffalo, N. Y., has been elected president of the Buffalo Control, Controllers' Institute of America.

J. F. MARLEY, formerly assistant mine superintendent of the Gouverneur Talc Company, Inc., at Balmat, N. Y., is now on the sales staff of the Eimco Corporation in the Duluth branch.

R. A. Costa

ROBERT A. COSTA has joined the staff of Kaiser Gypsum, a division of Kaiser Industries, Inc., where he will be administrative assistant to the general sales manager.

Mr. Costa was formerly administrative assistant to the chief engineer of Arabian American Oil Company in San Francisco. Prior to that he served nearly five years as an officer in various branches of the United States Navy.

CHARLES N. BAILEY, formerly assistant chief engineer of the International Minerals and Chemical Corporation, was recently appointed chief engineer for the Oliver Iron Mining Company. He succeeds Ford E. Boyd, retired.

DR. JOHN W. VANDERWILT, consulting geologist of Denver, Colo., was recently named president of the Colorado School of Mines. Dr. Vanderwilt succeeds Dr. Ben H. Parker, who has resigned.

GAIL A. HATHAWAY, special assistant to the chief of engineers, Department of the Army, Washington, D. C., has been nominated as 1951 president of the American Society of Civil Engineers.

An internationally known specialist in the field of water resource development, Mr. Hathaway has filled many important war and postwar assignments for the government. He has acted as special adviser to the chief engineer, European Theater of Operations, as engineering consultant to President Truman's Cabinet Committee on Palestine and as a member of the Inter-Departmental Committee of the United Nations Scientific Conference on Natural Resources.

G. G. COOLIDGE has been appointed executive assistant to the president of Harbison-Walker Refractories Company. He had earlier reliquished his title as vice president in charge of sales due to company retirement policies. Mr. Coolidge had been a vice-president of the company since 1933 and continues to retain his directorship, which he attained at the same time.

O. C. JONES, formerly with the Monsanto Chemical Company Phosphate Division (research department) at Anniston, Ala., was recently appointed assistant research director of the company's western division in Seattle, Wash. He assumed his new duties on July 1.

The appointment of SIDNEY J. SMITH as product manager of wallboard and accessory sales of Kaiser Gypsum, Division of Kaiser Industries, Inc., was announced recently.

Mr. Smith, whose new duties will make him responsible for sales of these products throughout the company's entire marketing area, has been affiliated with the company since 1948, when he was named export manager. From 1945 until 1948, he was privately engaged in the export and lumber business at Long Beach. During the war he served as finance officer of the Ferry Command at Montreal, Canada, and prior to that he was active in the private contracting field.

MELVIN H. BAKER, president of the National Gypsum Company, was signally honored on May 18 when he was selected to be one of 51 eminent business leaders to receive the Boston Jubilee award for "outstanding industrial statesmanship."

During the presentation ceremonies in Boston these men joined in issuing a statement called the "Boston Declaration," which reaffirms their faith in our free economy and pledges their efforts to strengthen it.

M. B. GENTRY, vice-president of the Freeport Sulphur Company, was recently named vice-president and executive committee member of the American Arbitration Association. He has been associated with Freeport Sulphur since 1935 and is also a vice-president and director of the Sulphur Export Corporation.

KELVIN T. BACON, for the past 20 years assistant credit manager, has been named credit manager of the Minnesota Mining and Manufacturing Company.

The Minnesota Mining & Manufacturing Company recently promoted one officer and elected two new ones.

CLARENCE M. KING, former treasurer and assistant secretary, has been named treasurer. He will continue as assistant secretary. GEORGE H. SCHOETTLY and EDWIN H. CHURCH are new assistant treasurers.

Mr. King joined the firm in 1926 as an accountant and was later appointed auditor. He became assistant treasurer in 1939 and was also elected assistant secretary in 1948.

Mr. Schoettly first served 3M as a bookkeeper for a year, then became assistant credit manager. He held that post for five years, and was credit manager for 20 years prior to his new promotion.

Mr. Church was controller of the Inland Rubber Corporation of Chicago before joining 3M in 1949, and was auditor of disbursements before assuming the post of assistant treasurer.

RAYMOND B. LADOO, consulting engineer, of Newton, Mass., has gone to Ireland under contract to the Irish government to investigate gypsum deposits recently drilled by Swedish engineers and proven to be of rather large extent. The purpose of his trip is to formulate a program for exploitation of such resources after studying the economic as well as the technological problems.

Whiterock to Manage Plant Of Mercer Lime & Stone Co.

According to an announcement made by Ray C. Noll, president of Whiterock Quarries, the management of the Mercer Lime and Stone Company, Branchton, Pa., has been taken over by Whiterock under the terms of a management agreement between the owners of the two firms.

The Mercer plant, built during the last three years, is a modern shaft kiln lime plant producing all forms of high-calcium chemical lime.

Mr. Noll stated that Whiterock had entered into a two-year contract with one of the western Pennsylvania steel companies for the entire output of Pebble Quick-Lime (for metallurgical use) from the plant.

Grit, Inc., Plant Destroyed In $750,000 Fire at Lithonia

A loss estimated at $750,000 resulted from a spectacular fire which swept the big processing plant of Grit, Inc., at Lithonia, Ga., on May 27. According to Hederson Hawkins, superintendent of the plant, the blaze originated in the primary screening section at about 10 p.m.

The plant, built of wood about 40 years ago, is owned by Norton, Charles and Key Davidson, brothers. About 100 men are employed by the concern. Grit, Inc., is said to be the largest granite grit producing firm in the world.

U.S. Bank, Manufacturer Underwrite Brazilian Plant

According to Washington, D. C., press reports, a credit of $2,070,000 has been granted by the Export-Import Bank of Washington to the Cia. Bahia de Cimento Portland, to aid this new Brazilian concern in the building of a $4,580,000 cement plant near the port of Salvador (Bahia). The credit would be used for North American equipment and services needed for the project, stated Herbert E. Gaston, chairman of the bank.

The Allis-Chalmers Maufacturing Company is joining with the Export-Import Bank in granting the Bahia company a credit of $206,000 for equipment purchased in the United States. Output of the new plant will be 100,000 tons annually.

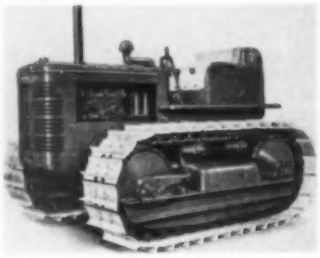
new machinery and supplies

PIT AND QUARRY

● Diesel Tractor

Higher power-performance ratings for the International "TD-9" diesel crawler tractor, resulting from new design changes in the "9" series four-cylinder engine, were recently announced by International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill.

The TD-9 now in production has drawbar horsepower of 40.5, as compared with 38.88 in the previous model. Horsepower at the flywheel is 51.5, an increase of 2 horsepower; and belt horsepower, formerly 45.91, has been raised to 48.5. Maximum drawbar pull in first gear with the engine operating at maximum torque is 11,400 lbs., a new high representing 1,150 lbs. more hauling



power. Travel speeds are unchanged, five forward to a high of 5.3 m.p.h. and one reverse, 1.7 m.p.h.

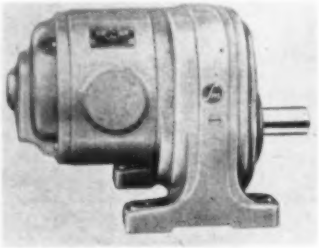
Greater engine power has been obtained through a redesigned combustion system featuring new pistons, an improved precombustion chamber, simplified injection nozzles, the new "A" model IH fuel pump and a higher compression ratio, 15.7:1, as compared with 14.4:1. In addition, the engine now has a counterbalanced crankshaft and new connecting rods for smoother operation and longer service life of parts.

● Splash-Proof Motors

Sterling Electric Motors, Inc., of Los Angeles, Calif., has announced that "Slo-Speed" geared electric power drives are now available in the "Splash-Proof" design for horizontal floor mounting, which is ideally suited for locations subject to direct streams of water or other liquids.

These motors are built with single- or double-reduction gears, providing speeds from 780 down to 20 r.p.m., in ratings of ½ to 15 hp., inclusive.

The end bell design permits free passage of ventilating air through the motor and prevents splashing liquids from reaching the interior of the motor. Seals are incorporated on shaft ends, assuring positive protection against the entry of liquids into the bearing housings.



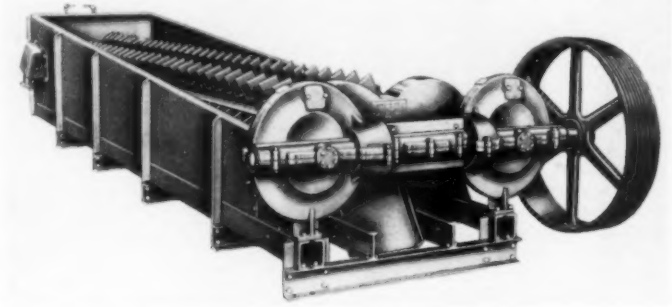
● Log Washer

Modern steel log washers which economically and efficiently remove tough clay and soft rock from sand, gravel, rock and ores are offered by the McLanahan and Stone Corporation, Hollidaysburg, Pa.

The device is said to remove as high as 85 to 90 percent of the toughest kinds of clay without damage to the material being washed. It is self contained and sturdily built for long service life and efficiency of operation. Each log is constructed of two to four heavy structural steel angles, braced inside and welded full length for maximum horizontal as well as girder strength through any axis. The design also tends to eliminate twisting.

The washer box is square, to facilitate scrubbing and afford maximum protection to the material being washed. All foreign particles are carried off with the waste water through the adjustable overflow spout at the rear of the washer box.

McLanahan Log Washers are custom-built for all installations and can be furnished in all sizes and with variable speeds of operation. Log capacities range from 25 to 200 t.p.h. and log speeds from 12 to 50 r.p.m. The size of feeds can vary from fines up to 4 in. square.



● Crankcase Oil

An improved crankcase oil for diesel and gasoline engines, which the manufacturer claims will combat sludge and engine deposits under severe operating conditions even when used with fuels containing up to 1 percent sulphur, has been announced by the D-A Lubricant Company, Inc., Indianapolis, Ind.

Among the advantages reportedly obtained by using the improved oil are: prevention of ring sticking, valve and rocker arm deposits and excessive liner wear when high sulphur fuels are used; prevention of cold engine sludge in stop-and-go operations as experienced in delivery fleets; and absence of rust and moisture corrosion in engines that are idle or in storage.

The manufacturer also states that the alkaline factor neutralizes the corrosive acids of combustion and results in reduced ring and liner wear in all types of deisel, gasoline and butane engines.

B.F.Goodrich

At Marquette Cement Mfg. Co. quarry: Mack tractor with double Easton trailers being loaded. Total weight of vehicles is 190,000 lbs. The problems of heavy loads and sharp rocks require the best in tires!

All-Nylon Tires: Best for hard labor on the rock-pile!

TIRES take a beating in quarry service; carrying heavy loads over the jagged rock underfoot and with the continual hazard of falling rocks—murderous, tearing impact.

With the new All-Nylon tire for rock and quarry work, B. F. Goodrich is first again with a money-saving development in tires. Nylon is extra strong and elastic. Size for size, nylon cord is twice as strong as the cord generally used in tires. Since the new BFG nylon tires have the same number of plies as other tires, you can see that cord body strength is greatly increased. These tires have over twice the bruise resistance and many times the flex life of other cord tires.

In all tests and in actual use up to date, not a single BFG All-Nylon tire has blown out, not one flex break has occurred. Nylon tires will provide big savings for strip-mining, quarry and other operations where heavy loads and rough terrain have made tire costs high.

The new all-nylon construction is typical of the continuous improvements being made in truck tires by B. F. Goodrich. Long ago, BFG engineers developed special types of tires for off-the-road service. They constantly developed new improvements. One of these was the nylon shock shield, a major construction advancement now used in all B. F. Goodrich truck tires with 8 or more plies (double nylon shock shield in large off-the-road tires)—including the new, All-Nylon tire.

For more information on how B. F. Goodrich nylon tires can do more work for you and save you money, see your BFG Dealer or write *The B. F. Goodrich Company, Akron, Ohio.*

● Crinkled-Paper Bag

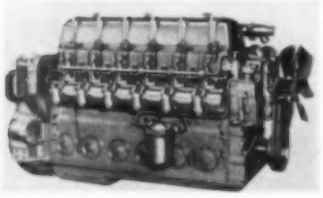
A new all-crinkled Multiwall paper bag, the "Sharkraft," has been announced by the Chase Bag Company, 309 W. Jackson Blvd., Chicago 6, Ill.

Although it resembles a regular smooth Multiwall in style and construction, the all-crinckled Multiwall bag's design gives it inherent longitudinal stretch. This quality is the result of using so called "wet creped" or secondary creped paper, containing approximately 12 to 15 percent stretch in the individual ply construction. Three-, four- and five-wall bags are produced by laminating the individual walls of crinkled paper together with a light coating of pliable adhesive. According to the company, a feature of these bags is their ability to expand and absorb shock and strain.

● Diesel Engines

A design to withstand loads beyond any that may ever be experienced, even in the severest application, is the outstanding feature of the "P & H" line of diesel engines, according to the manufacturer, the Diesel Engine Division of the Harnischfeger Corp., Port Washington, Wis.

Built on the two-cycle principle, these diesels are available in 1-, 2-, 3-, 4-, and 6-cylinder models (all with bore and stroke of 4.5 x 5.5), delivering 24, 45, 65, 90, and 137 b.h.p., respectively at 1,400 r.p.m. These engines, all with a 16:1 compression ratio, are said to deliver from 7 to 17 percent more b.h.p. at 1,400 r.p.m. under intermittent load conditions. All models have forced feed lubrications, 4-in. main bearings, and 3-in. crank pins.



A patented P & H cylinder head and liner assembly is used. The liners are hardened steel alloy. Each cylinder has an independent power assembly unit, affording savings in time on maintenance and overhauls. Only one valve is necessary, for exhaust, due to the two-cycle type ported liner air intake. The fuel consumption for all models averages .45 lbs. per b.h.p.-hr.

Other advantages claimed for these engines are their great adaptability to varying speed and loads, their simple design for quick servicing, and their low weight per horsepower, as evidenced by 15 lbs. per b.h.p. at 1,600 r.p.m. for the 4-cylinder model.

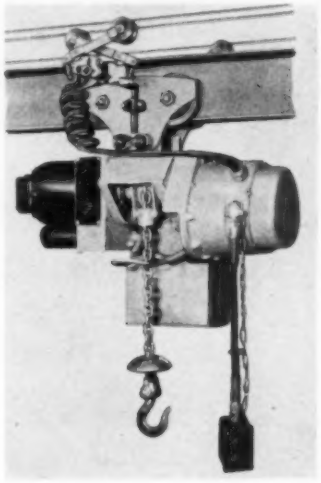
● Chain-Type Electric Hoist

Lifting speeds up to 41 f.p.m., a lower as well as an upper limit stop, and a wide "pick-up" angle, are three of the new performance features of the chain-type "Load King Electric Hoist" just announced by The Yale & Towne Manufacturing Company, Philadelphia Division, Philadelphia 15, Pa.

The hoist is available in load capacities of 500, 1000, and 1500 lbs. Standard models lift loads through any height up to 40 ft. The hoist's principal distinction is that link chain, over an electrically-driven sheave, supports the load. This permits extra long lifting lengths, since the wound-up chain does not wrap around a drum, but collects in a metal container as the hook raises.

The hoist hook can "reach out" as far as 30 degrees from the vertical to pick up loads. The limit stops prevent overtravel of the hook when lifting or lowering. They operate when the hook reaches predetermined levels and break the electrical circuit to return the push-button controller from either the "up" or "down" position to "neutral."

The hand controller is suspended by a light-gauge chain so that neither electric cable nor electrical connections take the weight of the controller, while the flexible control cable carries only switch-energizing current, and not load current.



● Portable Belt Conveyor

A new series in the Atlas portable belt conveyor line, the "Model 17," has been announced by the Atlas Conveyor Company, Clintonville, Wis. Available with 18- or 24-in. belts running at 200 f.p.m., the conveyors are supplied in 30- to 60-ft. lengths, in intervals of 3 ft.

The capacity averages from 75 cu. yds. per hour for the 18-in. belt to about 140 cu. yds per hour for the 24-in. model, depending on the material and method of feed. Power is supplied by either gasoline or electric motors of 5- to 10-hp., varying with the size of conveyor.

The maximum angle of incline is 25 degrees for the standard models, with steeper inclines available on special order.

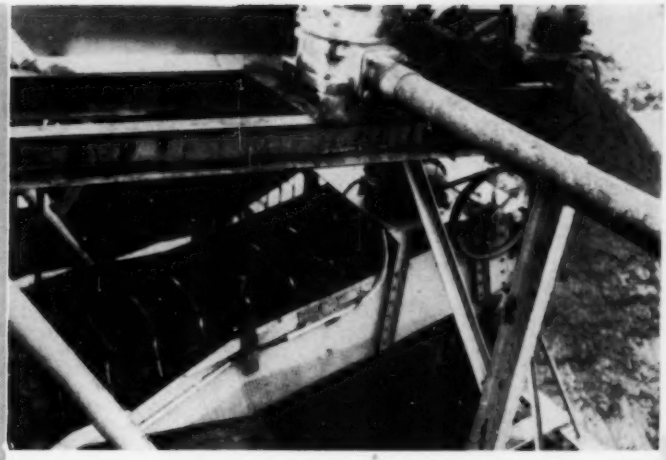
The Model 17, according to the company, requires only 13½-ft. of road clearance and needs no dismantling for highway towing.

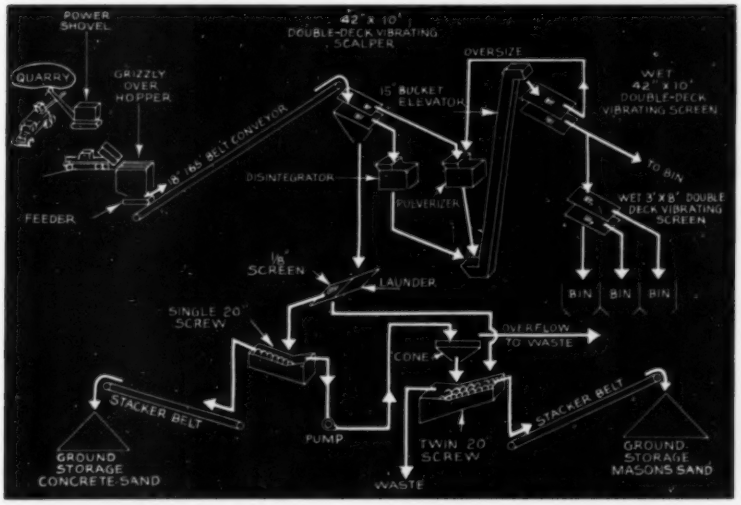
Anti-friction idler and shaft bearings, belt cleats, pneumatic tire wheels, special types of electric motors, and swivel wheels that permit a full 90-degree swing around the foot end are all available as optional equipment.

PROFITS SOAR

WITH TWO *Eagle Washers* ON THE JOB!

At Airport Sand and Gravel Co. WEST WYOMING, PENNA.





THE flow sheet below shows the plant layout of the Airport Sand & Gravel Co. Deposit averages 35 ft. in depth. Output is 100-tons per hour of concrete sand, mason sand and washed gravel, graded to 2½", 1¼" and ¼". Gravel is screened out and all sand is chuted to ⅛" wet screen. Material retained by screen flows to an Eagle 22' x 20" Single Screw Washer - Classifier - Dehydrator. Here clean, concrete sand is produced. Material flowing over the long weir is pumped to an Eagle 22' x 20" Double Screw Unit, shown above. Here mason sand is washed, classified, dehydrated and conveyed to stockpile. Material discharged over long weir end of tub — practically clear water — flows to waste.

Wherever materials are being produced for concrete highways and building purposes you'll find Eagles on the job, delivering materials to specifications and recovering marketable fines that are normally wasted. Eagle Fine Material Washers quickly return their cost. Ask for Catalog 47.

SINCE 1872 Progress...Service

"SWINTEK" DREDGE LADDERS—SCREW WASHERS
LOG WASHERS—DEHYDRATORS—SAND TANKS
CLASSIFIERS—REVOLVING SCREENS

EAGLE IRON WORKS

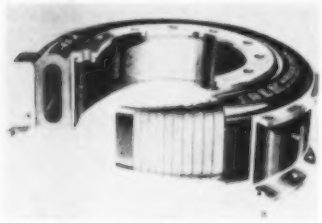
133 Holcomb Ave. • Des Moines, Iowa

Eagle "Swintek" Dredging Ladders increase production. Chain screens the intake nozzle, as it digs, assuring maximum, uniform flow of solids. Lower cost per ton of material produced. Catalog 745.

● Redesigned Coupling

The Falk Corporation, Milwaukee 8, Wis., has announced that the Falk "Airflex" coupling has recently been redesigned after ten years of service in coupling applications.

Improvement in rubber composition and bonding have increased the torque capacity 20 percent above previously published values, while the hubs and adaptor plates have been redesigned to



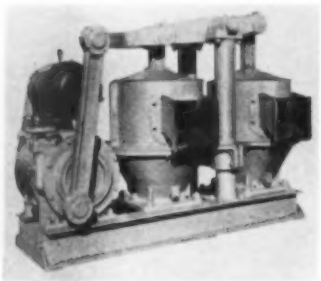
facilitate disconnection and removal of the entire gland assembly.

Redesigned components are entirely interchangeable with the equivalent components of all "Airflex" couplings now in use, and standard parts may be combined to allow six different mounting arrangements including flange mounting on a flywheel. In addition to these improvements, the manufacturer states that stiffness factors can be controlled and are available for torsional analysis. This coupling is designed primarily for engine drives and for applications involving extremely severe torque fluctuations.

● Diaphragm Pump

The Dorr Co., Barry Place, Stamford, Conn., announces the newest addition to its line of diaphragm pumps, the "Dorrco Type W," designed to handle 75 c.f.m. of pulp. According to the manufacturer, it is especially valuable wherever big tonnages, big flows, or heavy pulps are involved. It is also claimed to be ideal for the handling of thickener and hydroseparator underflows, due to its controlled action, sturdy construction, anti-friction bearings, and flexibility of operation.

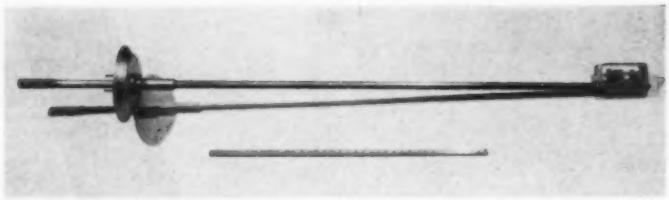
Classed as a duplex diaphragm pump, the Dorrco Type W is powered by a



standard electric motor connected to a variable speed unit by conventional V-belt drive. The unique variable speed drive is encased in an oil-tight housing and permits a stroke adjustment capable of varying the discharge rate within a 6 to 1 range while the pump is in operation. The stroke adjustment handwheel is conveniently located and a calibrated stroke indicator is provided for a close check on the pumping operation at all times.

Reference to the illustration shows that a crank and connecting rod system transmits power to the rocker arm through a ball bearing. The rocker arm, riding on oilite bearings and supported by two bearing posts, actuates the plunger rods and the attached Dorrco diaphragms. The latter are of beaded construction arranged for quick easy replacement, and flat valves are used on the intake and discharge, to prevent clogging.

The Dorrco Type W 6-in. model will pump 30 c.f.m. of pulp, and the 8-in. model 75 c.f.m. at a suction lift equivalent to 14 ft. of water at sea level. In terms of dry solids at 2.65 sp. gr., this is 1080 tons per 24 hrs. for the 6-in., and 2450 tons per 24 hrs. for the 8-in. with a 50 percent water pulp. To protect against abrasion, both discharge spouts are rubber lined.



● Jet-Piercing Blowpipe

A jet-piercing blowpipe which can be held in an operator's hands and used for piercing blast holes in rock quarries is a new product of The Linde Air Products Company, 30 E. 42nd Street, New York 17, N. Y. It is claimed that holes for 1⅛-in. diameter dynamite can be quickly pierced to a depth of 5 ft. in hard and abrasive rocks and ores, such as sandstone, quartzite, and granite. Longer blowpipes can be supplied, on special order, for piercing holes to a depth of 7 or 9 ft. or more. The jet-piercing blowpipe is so designed that it can be used at any angle to pierce horizontal and vertical holes, as well as diagonal holes "drilled" from underneath in protuding rock.

Burning gases at a temperature from 3,000 to 4,000 deg. F. are directed against the rock at a supersonic velocity. Although a hole quickly develops, the rock usually does not melt. Instead, the intense flame concentration results in continuous, localized thermal expansion which causes rapid spalling of the material in the developing hole. Steam automatically generated from the blowpipe's cooling water, together with combustion gases, flush the spallings from the hole.

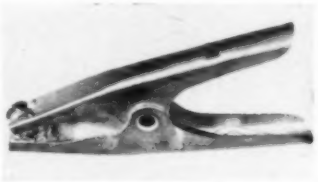
Speed of piercing, in many cases, is much greater than that of older drilling methods. These results have been obtained in field tests: (a) in sandstone and feldspathic quartzite—50 to 60 f.p.h.; (b) in South Dakota quartzite—45 to 50 f.p.h.; (c) in granite—22 to 25 f.p.h.

This new manual blowpipe, known as the Linde "FSJ-1" Jet-Piercing Blowpipe, burns a mixture of oxygen and either kerosene or fuel oil. The fuel is burned by the oxygen within a combustion chamber in the blowpipe head. Burning gases leave through a divergent nozzle, i.e., a nozzle with expanding taper, which makes possible the exceedingly high flame velocity. The nozzle is protected by a hole-sizing shell and water-spray cap.

Cooling water flows through the blowpipe casing, passing around the internal oxygen and fuel tubing, and around the combustion chamber. Water leaves through the water-spray cap, and, in operation, is turned to steam by the heat of the process.

The FSJ-1 blowpipe has these special design features: a sliding shield to protect the operator against steam and spallings when exhausted from the hole; a divergent nozzle to increase the velocity of gases leaving the blowpipe to between 5,000 and 6,000 ft. per second; a hole-sizing shell to assure the proper diameter of hole and to break up any accumulation of spallings; and a water-spray cap on the nozzle end of the blowpipe to permit water in leaving the blowpipe to help exhaust spallings from the hole. This blowpipe, about 7 ft. in length, weighs only 17 lbs., 4 ounces.

Oxygen requirements for the FSJ-1 blowpipe are approximately 520 cu. f.p.h. at a pressure (at blowpipe) of 150 lb. p.s.i. Fuel consumption is 28 lb. per hour, or approximately 4 gal. per hour, also at a blowpipe pressure of 150 lb. p.s.i. Cooling water is consumed at a rate of 50 gal. per hour, at a pressure of 50 lb. p.s.i.

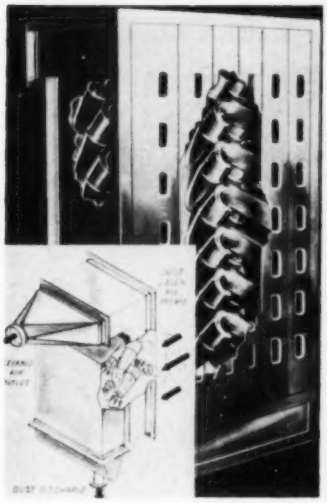


A new light weight, ground clamp of 300 ampere capacity, the GC-3, has been developed by The Lincoln Electric Company of Cleveland, Ohio, to eliminate for welders the inconvenience of handling heavy duty clamps on jobs where their extra capacity is not needed. The clamp weighs 1½ pounds and has a jaw spread of 2½ inches.

● Dust Collector

A new design in multiple cyclone-type dust collectors is being manufactured in a wide choice of metals by the Dustex Corp., 1758 Walden Ave., Buffalo, N. Y. The collectors return clean air to working areas and are constructed without moving components or filters. Known as the "Dustex", the collector has reportedly obtained wide consistent efficiency of 100 percent at 12 microns on dust having a specific gravity of 2.54, and is designed to operate effectively at unusually high temperature.

One of the features of this collector



is the 5-in. diameter tubes, constructed in parallel, readily adaptable to a great variation of assemblies. Also of importance is the design of the inlet and internal air passage which prevents build up or plugging in the handling of sticky or fibrous materials.

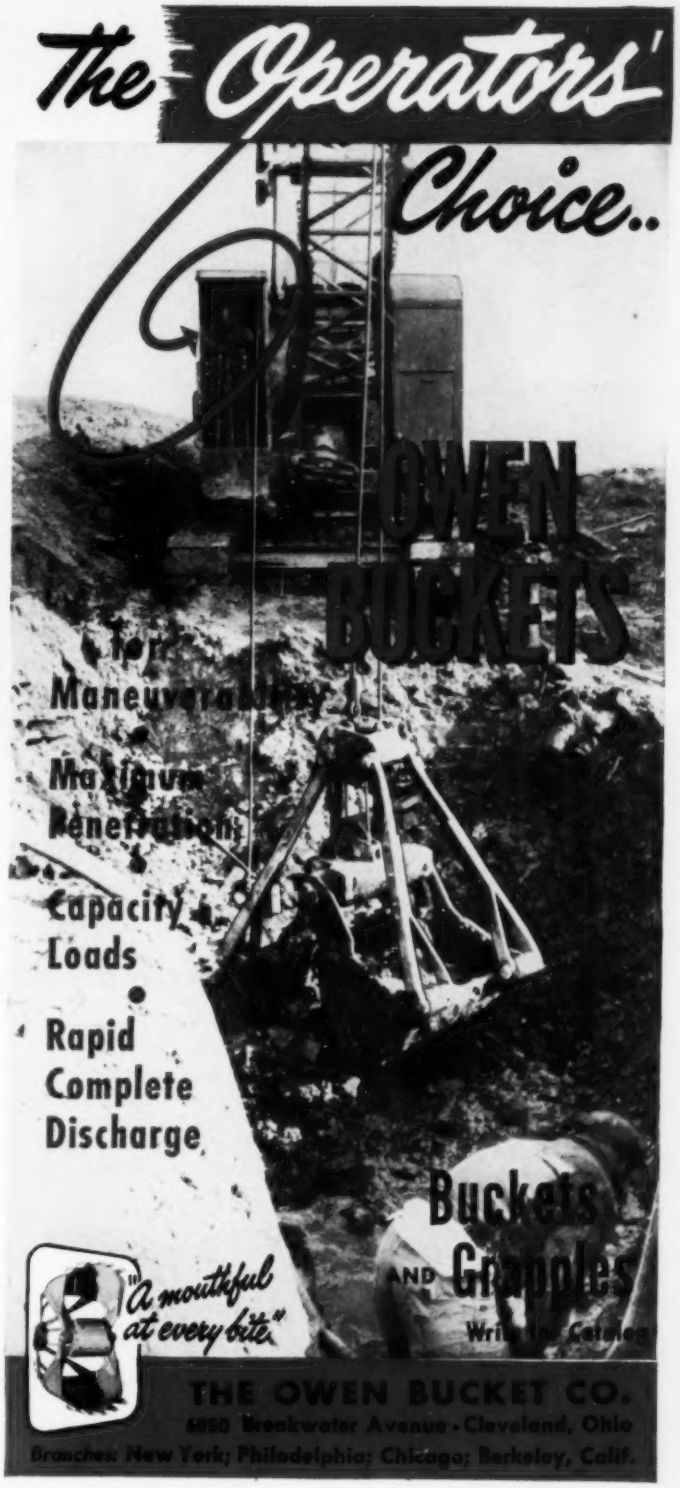
● New Welding Cable

A new type of welding cable for both electrode and ground, "Linconductor" cable, combining new design features and manufacturing methods to increase both cable life and flexibility, is now available through the Lincoln Electric Company, Cleveland, O. The new features reportedly combine to produce a low-cost cable with high performance.

Linconductor cable is unique in that the outer cover is neoprene with a paper separator of 2½-mil thickness between the outer cover and the copper stranding, promoting long cable life and maximum flexibility with freedom from kinking and copper oxidation.

As an exterior cover for welding cable, neoprene has a tendency to resist oil deterioration. The Lincoln Co. also cites its high tensile strength and resistance to flame burning, copper oxidation, abrasion, impact, fatigue, bending, and permanent set after stretching.

Linconductor cable is available in the following sizes: 4/0, 3/0, 2/0, 0, #1, #2, #4 and #6.



SAVES $12,000
A YEAR FOR AN OHIO LIME CO.

WHEN THIS 50-TON G-E DIESEL-ELECTRIC SWITCHER replaced a 65-ton steam locomotive at a plant of the Kelley Island Lime and Transport Company, operating costs were greatly reduced . . . $1000 a month! Fuel costs alone were down $12.66 daily. In one nine-hour trick per day, the new diesel-electric does the work the steamer took *two* eight-hour tricks to do.

No working time is lost in firing up, refueling is required only about twice a week and maintenance is done when the locomotive is off duty. Acceleration is faster, locomotive operation is easier. In two years of continuous service over the plant's seven miles of track, with grades up to 1.4 percent and curves up to 25 degrees, this locomotive hasn't lost a day. Fuel savings, reduced operating time and high availability are producing a return on Kelley Island's investment that will pay for the locomotive *in less than three years.*

Are you getting smooth, economical performance like this from your own locomotive? G-E diesel-electrics are reducing costs in your industry, too. A G-E transportation specialist can tell you how much you can save in advance. See him today. ***Apparatus Dept., General Electric Co., Schenectady 5, N. Y.***

Free Bulletin—Facts on Low-cost Switching

Operating Results

Graphs **Tables**

GENERAL ELECTRIC

120-50

Section 4909A
General Electric Co.
Schenectady 5, N. Y.
Please send me your fact-filled locomotive bulletin.
I need it:
For reference purposes
To make a survey of our own locomotive requirements.

Name _____

Company _____

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1. **Bulletin on McLanahan and Stone Log Washers.** 8 pages. Covers washers with capacities from 25 to 200 t.p.h. and log speeds from 12 to 50 r.p.m. McLanahan and Stone Corp.

2. **Atlas Conveying Equipment—Model 17 Portable Belt Conveyor** (Form No. 17B-5-1-49) and **Atlas Belt Conveyor Idlers** (Bulletin No. 8). Illustrated folders presenting outstanding features of these devices, together with specifications, and optional equipment list (Model 17) and dimensions (idlers). Atlas Conveyor Co.

3. **Kent Lintelator.** Dimensions of both standard and "super" Lintelators given; step-by-step picture story of the manufacture of lintels by this process is told in action pictures; outstanding advantages are described; literature on other Kent equipment is listed. The Kent Machine Co.

4. **Rok-Bits — Crown Designed Carbides.** 20-page pocket-size booklet containing a picture story of a method for reconditioning tungsten-carbide drill bits. Also contains helpful operating suggestions for drillers, and serves as a complete catalog. Rock Bit Sales & Service Co.

5. **General Electric Gear-Motors.** Contains complete information on integral- and fractional-horsepower gear-motors for low-speed drives, listing construction features, advantages, hints on selection and application, and electrical types and characteristics. General Electric Co.

6. **Syntron Concrete Vibrators.** Illustrated 8-page booklet describing the features and applications of vibrating floats, form vibrators with vise clamps, and flexible shaft vibrators for mass placement. Also listed are specifications and accessories for each model. Syntron Co.

7. **Diesel Power.** Briefly describes outstanding features of the P&H line of 2-cycle diesels. Also available are flyers describing specifications and characteristics of each model in the line, 1-cylinder 187-C, 2-cylinder 287-C, 3 cylinder 387-C, 4-cylinder 487-C, and 6-cylinder 687-C. Diesel Engine Division, Harnischfeger Corp.

8. **McLanahan Single Roll Rockmaster Crushers.** An 8-page bulletin with illustrations describing the origin, development, use, and complete construction features of single-roll crushers. Assembly drawing is included. Other products and special services listed. McLanahan and Stone Co.

9. **Engineering Properties of Inconel.** Technical bulletin T-7, 24 pages, describing in detail composition, physical constants, mechanical properties, temperature effects, corrosion resistance, working characteristics, mill products, and uses. Also information on Inconel X and a list of other technical bulletins. Technical bulletin T-9, giving similar information on **Engineering Properties of K Monel and KR Monel** is also available. Development and Research Division, International Nickel Co., Inc.

10. **Basic Industries Research and Testing Facilities.** Basic industries commercial research and testing facilities are described in detail. Contains a list of industries served and laboratory equipment. Fully illustrated. Allis-Chalmers Mfg. Co.

11. **B. F. Goodrich Hose Couplings and Fittings.** 12-page catalog section No. 3100. Pictures and gives details on each type of coupling and fitting, along with specifications, pressure recommendations, and thread description. B. F. Goodrich Co.

12. **Air for Power; Cleveland Pneumatic Vibrators.** Catalog No. 105. 12 pages. Illustrates 29 types and 14 sizes of air-operated valves, vibrators, and fittings for shaking and settling materials, and includes story on vibrator operation and functions. Cleveland Vibrator Co.

13. **Pioneer Twin- and Triple- Roll Crushers** (Form No. 617) and **Pioneer Model 101 Continuflo Bituminous Plant** (Form No. 620). First covers a new line of redesigned crushers giving industrial applications, along with tables and information on crusher selection and construction features. Bulletin on the Model 101 Bituminous Plant, the largest in the line, covers operation, construction, and special features. Pioneer Engineering Works.

14. **Yale Yard King 40 Gas Truck.** Bulletin No. 5124. Gives complete dimensions, capacity and specifications. Explanatory charts and diagrams are included. Philadelphia Division, Yale and Towne Mfg. Co.

15. **Flexible Rubber Pipe.** Bulletin No. H-1. Describes applications and comparative qualities of rubber as against metal pipe in many services, exclusive of long lines. A progressive picture story shows installation and a number of case histories. Hewitt Rubber Division, Hewitt-Robins Inc.

16. **Knickerbocker 28-S** (Form No. 28-1-48), **Knickerbocker 6-6E** (Form No. 05E6-47), **Knickerbocker 3½ T3 Trailer Type Mixer.** (Form No. 47-T3). Design and operating features of these concrete mixers are fully explained. Specifications and dimensions are included. The Knickerbocker Co.

17. **Lull Shoveloader.** Form No. AD-32 demonstrates with design and application features of the various models in this line. Tables and photographs supplement the text. Lull Manufacturing Co.

18. **Here's a New Lightweight Conveyor.** Brief specifications, a complete price list of all standard and optional equipment, and data on discharge heights and maximum angles are included. New London Engineering Co.

19. **Solve Your Pneumatic Materials Handling Problems With a Bloapco Rotary Feeder Valve.** Bulletins 491 and 491A describe in detail the outstanding features and specifications, with many photographs, drawings and tables. Blower Application Co.

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21. The Modern Approach to Automatic Delivery; Lectro-Lift. Bulletin gives information on construction features, operating cost savings, and applications of models 9CS and 6CS lift trucks for transporting building blocks. L. I. Belden Manufacturing Co.

22. Controlled Variable Vibration. Folder illustrates operating characteristics and construction features of a high-speed vibrator screen. Coyle & Roth.

23. Hercules Hoists and Dump Bodies for All Trucks. Form No. 3549. Various types of medium-duty truck bodies, truck body hoists, special bodies, and accessories are described, accompanied by photographs. Hercules Steel Products Corporation.

24. Link-Belt P. I. V. Automatic Controls. Outstanding features of electronic, hydraulic, mechanical and pneumatic controls are described, as are numerous industrial applications. A list of sales offices is provided. Book No. 2340-4-50. Link-Belt Co.

25. Engine-Driven Self-Priming Centrifugal Pumps. Bulletin No. 110. A.G.C. rated units from 5,000-g.p.h. to 200,000-g.p.h. capacity are described in detail. Performance tables and pictures are also included. General design characteristics common to all models are discussed and illustrated with cutaway views. Carver Pump Co.

26. The Denver Selective Mineral Jig. 16 pages. Bulletin J2-B8. Describes how this pulsating selector treats unclassified, unsized feed. Much data on operation, mechanical construction, specifications, and applications, accompanied by a great number of photographs, diagrams, tables, and cutaways. Denver Equipment Co.

27. Grey-Rock Industrial Catalog No. I-102. This 100-page catalog covers the various types of friction materials (brake linings, clutch facings, etc.) suitable for shovels, draglines, cranes, tractors, and industrial equipment. Friction material size data, equipment manufacturers' part numbers, brake band types, and material recommendations are covered. Grey-Rock Division, Raybestos-Manhattan, Inc.

28. B. F. Goodrich Work Suits (Catalog Sec. 12005) and **Industrial Raincoats** (Catalog Sec. 12000). These catalog sections describe in technical detail various new types of Koroseal and rubber work suits and raincoats. B. F. Goodrich Co.

29. Bailey Control Linkage. General Specification CA942 describes flexible control drive design, drive and driven levers, connecting links, bearings and shaft, cable, and rotation; also includes sections on selecting linkages, with numerous diagrams illustrating applications. Bailey Meter Co.

30. Cummins High-Speed Diesel Catalog (Bulletin No. 5218C). 36 pages. Covers 68 high speed diesels for automotive, industrial, and marine applications. Lists for the first time 27 new models introduced during the last 12 months. Features a composite silhouette drawing indicating mounting dimensions and the range of horsepower available within given mounting dimensions. Cummins Engine Co.

31. The GM Diesel Quiz. A vest-pocket pamphlet giving in question-and-answer form the characteristics, and applications of GM diesels. Detroit Diesel Engine Division, General Motors Corp.

32. The Conveyor. A quarterly publication of about 20 pages covering actual applications and design features of conveyors and conveyor-elevators; also transmission equipment. Stephens-Adamson Manufacturing Co.

33. Whiting—The Dependable Electric Hoist. Bulletin H-112. Covers the outstanding features of these hoists from ¼- to 2-ton capacities. Sketches, cutaways and tables are included. Whiting Corporation.

34. Drive Your Light Wagon Drill and Compressor (Bulletin No. T-16). Shows complete specifications and dimension data for combination tractor-compressor and light wagon drill. Table of costs comparing this combination unit with separate equipment is included. LeRoi Company.

35. Martin Folding Gooseneck Trailer. A 4-page bulletin covering the principal features of the 20-, 27-, and 32-ton models. Martin Machine Company.

36. 6 cu. ft. Plaster and Mortar Mixer. Bulletin R50-11. Supplies data and features on this new mixer. Ransome Construction Equipment Division, Worthington Pump and Machinery Corp.

37. The Flexicore Split System of Warm-Air Panel Heating. Folder describes unusual system for building or residence heating, using hollow core, precast concrete floor slabs as panel heating units. List of manufacturers included. The Flexicore Co., Inc.

38. Rock Buster. Describes new Type 303 impact crusher for reducing hard, friable materials. Dimensions, specifications, and capacity are discussed. The Jeffrey Manufacturing Co.

39. Traylor Feeders. 20-page bulletin, No. 1114. Covering apron, grizzly, table, and slurrey feeders. Sketches of each type show interior construction and special features. Actual feeder installations are shown. Traylor Engineering and Manufacturing Co.

40. 60-ft. Portable Compressor. Folder H-850-B71. Text, supplemented by tables and slurry feeders. Sketches of each type features, capacity and applications of this "Blue Brute" compressor. List of distributors included. Worthington Pump and Machinery Corp.

41. Hardinge Rod Mills. Bulletin 25-B. Revised literature on rod mills for grinding and pulverizing. Typical installations, performance data and construction features are covered. 16-page. A reference list of other Hardinge Bulletins is included. Hardinge Co., Inc.

42. Modern Time and Cost Savers. Bulletin 63-A. Covers standardized conveyor units. Complete data on 11 different types of portable belts, rollers, wheel conveyors, etc. Drawings, photographs, and tables are used to illustrate the text. Standard Conveyor Co.

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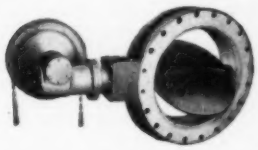

well as the valve body. Long-wearing resistance to abrasives is said to result, since the rubber is not totally flexed or distorted.

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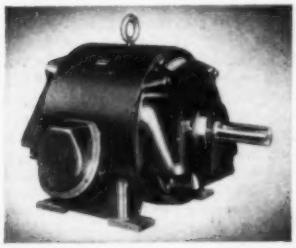

the end brackets. These motors are equipped with prelubricated bearings.

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legal decisions

Review of New Law Suits Affecting the Non-metallic Industry
By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Recently a reader asked this question: "If an insurance company refuses to pay a loss, what rules decide whether the insurance company is liable?"

All courts hold that an insurance policy is a contract between the insurance company and the insured. Since the insurance company writes the insurance policy, the courts lean favorably toward the insured, in case the policy is ambiguous. In other words, under the law, an insurance policy should be construed liberally in favor of the insured. Hence, where doubt arises as to the legal construction of an insurance contract, the court will hold the insurance company liable unless the testimony is clearly in favor of the company.

For example, in *Aetna Insurance Company v. Rhodes*, 170 Fed. (2d) 112, the testimony showed facts, as follows: The Aetna Insurance Company issued to one Rhodes a fire insurance policy against loss by fire in the amount of $33,750.00. The insurance policy contained a clause which required Rhodes to report to the insurance company each month the total value of the property insured. The clause clearly stated if Rhodes failed to file with the company *any* monthly report, then the policy covered *only* the value of the property included in the last monthly report.

During the six months the policy was in force Rhodes failed to file with the insurance company any monthly report. Rhodes had a fire loss. The insurance company refused to pay the loss, claiming that Rhodes' failure to file the monthly valuation reports was a breach of the insurance contract, and hence the policy was forfeited.

The higher court refused to hold that the policy was forfeited for two reasons: (1) the policy's clause said that if Rhodes failed to file the monthly report, the policy covered the valuation listed in the last month's report; and (2), the policy clearly stated that the policy would become void only if Rhodes should willfully conceal or misrepresent material facts, or was guilty of fraud. The court said:

"Apparently Aetna (insurance company) did not believe that failure to make the valuation reports forfeited the policy for, with knowledge that four reports were past due, it gave no notice of cancellation. . . It should be borne in mind that the value of the merchandise was fixed in the policy on the day of its issuance and that such valuation was controlling until the next monthly report was due. . ."

For comparison, see *Master v. New York Life Insurance Company*, 183 U.S. 25; *Mail v. Moore*, 15 F. (2d) 547; *New York Underwriters' Fire Insurance Company v. Malham & Company*, 25 F. (2d) 415; *Travelers Protective Ass'n. of America v. Jones*, 5 Cir., 91 F. (2d) 377; *Fidelity & Guaranty Company*, 292 U.S. 80; *American Surety Company v. Pauly*, 170 U.S. 133, 144; *Stipcich v. Metropolitan Life Insurance Company*, 277 U.S. 311; *Sentinel Life Insurance Company v. Blackmer*, 77 F. (2d) 347; and *Fireman's Fund Insurance Company v. Globe Nav. Company*, 236 F. 618.

In view of these higher court decisions, the law is established as follows: An insurance company *never* is liable for verbal promises regarding the scope of protection afforded by an insurance policy; an ordinary insurance agent who solicits your insurance business is *your* legal employee, not a legal agent of the insurance

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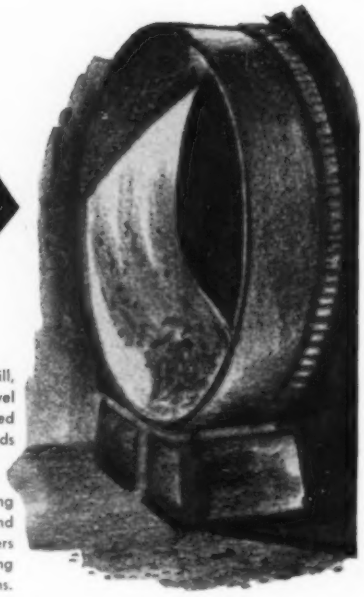

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Fair Resemblance

Considerable discussion has arisen form time to time over the legal question: What degree of resemblance must "carving" in stone be to a copied picture to satisfy a reasonable purchaser?

For example, in *Bovello v. Falvey Granite Company, Inc.*, 71 Atl. (2d) 536, it was shown that the Falvey Granite Company signed a written contract to furnish one Bovello a cemetery memorial and erect it on his wife's grave for a price of $2,000. The headstone was to be of "special" design. Bovello in negotiating with Falvey exhibited a small print of a picture of St. Theresa. He explained that his wife had prayed before this picture and because of this he wished to have a likeness of his wife's saint carved in the stone. Bovello paid one-half the purchase price when the contract was entered into, and agreed to pay the balance when the monument was erected.

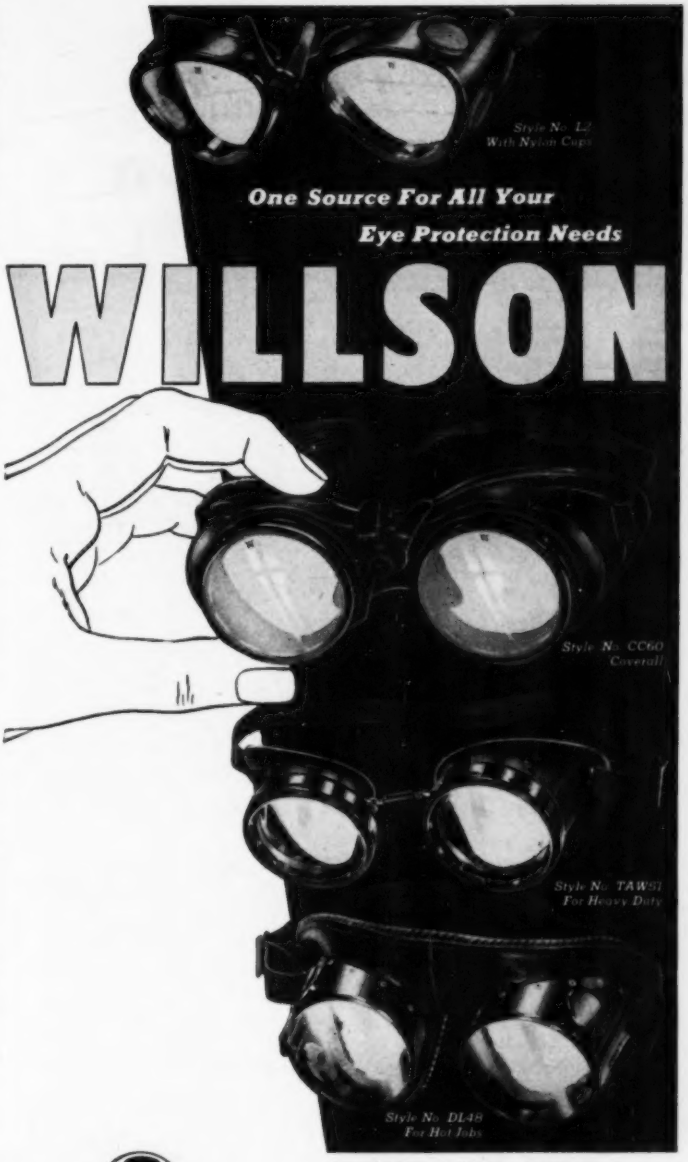
The monument was completed and installed at the cemetery. Shortly thereafter Bovello notified the Falvey Granite Company that he was dissatisfied with the figure and that it did not resemble the picture. He refused to pay the balance of the purchase price and suit was instituted by the Falvey Granite Company to recover the balance due.

The higher court held in favor of the Falvey Granite Company in view of testimony which showed that the carving somewhat resembled the picture of St. Theresa. The court said: "The fact that the picture was to be used as a model does not necessarily mean that the parties intended the stone carving to be an exact reproduction."

Partnership Liability

Modern higher courts consistently hold that any financially responsible partner is liable for the *full* debts of the partnership. Generally speaking, no person is a lawful partner unless he agrees to share the profits and losses of the partnership business. However, according to a recent higher court, all persons who enter business *intending* to *incorporate* the business are liable as full and legal partners.

For example, in *Holzer Sheet Metal Works, Inc. v. Reynolds & Marshall*, 43 So. (2d) 169, the testimony showed facts, as follows: For some time one Reynolds, under the name "Reynolds Concrete Products Company", owned and operated a concrete products busi-



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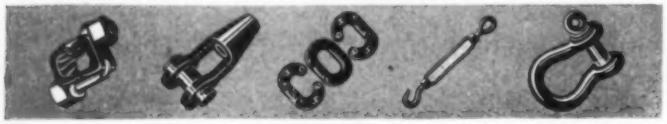

ness in New Orleans. He required financial assistance and asked a man named Marshall to assist him financially. Marshall paid some of the outstanding debts of Reynolds Concrete Products Company and advanced or loaned Reynolds some money under an agreement that Marshall would advance certain funds to form a corporation which was to be organized for the conduct of the business of the Reynolds Concrete Products Company.

Later certain sellers of materials which had been delivered to Reynolds sued Marshall for the full amount due. Marshall denied any liability on the grounds that he was not a partner in the Reynolds Concrete Products Company. It is interesting to observe that the higher court held Marshall liable for all debts owed by the company, and said:

"The business which they conducted was the manufacture and sale of concrete products . . . Marshall . . . maintains that, as a matter of law, there was never any partnership because there was never any agreement between himself and Reynolds that they would form a partnership. He (Marshall) has overlooked entirely the well established principle of law that where several persons agree to form a corporation and, pending incorporation, conduct a business for which the corporation is to be organized, during that period they *are* partners."

For comparison, see *Lind v. Senton*, 10 La. App. 633, 120 So. 535. Here three persons took the initial steps towards incorporation of a partnership which was never consummated. They carried on the business which they had intended should be incorporated. The higher court held that all persons who intended to incorporate the business were liable for debts and other liabilities acquired by the firm which never was incorporated.

Guarantee Vs Fraud

Considerable discussion has arisen from time to time over the legal question: Can a seller completely relieve himself from all liability on verbal guarantees by inserting in a written contract a clause that all verbal guarantees or statements made by the seller are hereby canceled. The answer is, no.

See *Omar Oil and Gas Company v. Mackenzie Company*, 138 A. 392. This court explained that a very thin line divides those statements which are, from those which are not, actionably fraudulent. Also, this court held that before a seller is liable for fraud the purchaser must prove *all of these facts:* (1) a representation; (2) its falsity; (3) its materiality; (4) the seller's knowledge of its falsity or ignorance of its truth; (5) his intent that it should be acted on by the person and in the manner reasonably contemplated; (6) the purchaser's ignorance of its falsity; (7) his reliance on its truth; (8) his right to rely thereon; (9) and his consequent and proximate injury.

Original Must Be Signed

According to a recent higher court, a recorded chattel mortgage or conditional contract is void which is not

signed by the purchaser or mortgagee. The fact that one or more *copies* of the instrument is signed is immaterial if the recorded instrument is unsigned.

See *Tardiff v. M-A-C Plan of Ne*, 67 Atl. (2d) 337, where it was shown that a seller made a conditional sale contract in duplicate. One of these copies was signed by the purchaser, but that copy was never recorded. The other unsigned copy was recorded.

In later litigation the higher court held that the seller was not protected by the unsigned recorded instrument and said:

"That instrument presented for record was unsigned. The lack of a signature is as outstanding a defect as the omission of any one formality could be."

Watch Out for Minors

The higher courts consistently hold that a minor can at any time rescind a contract, return purchased merchandise, and demand the full amount of money he paid.

For example, in *Carter v. Jays*, 65 Atl. (2d) 628, it was shown that a purchaser named Carter went to the Jays Company and purchased concrete blocks. Later Carter decided that he did not want them and returned them to the dealer and asked for a refund of the purchase price. The dealer refused, and Carter filed suit.

During the trial the dealer argued that he should not be compelled to cancel the contract and refund the money paid by Carter because he sold the blocks to Carter upon his fraudulent representation that he was of full age. Nevertheless, the higher court ordered the dealer to return Carter's money and said: "Agreements with infants relating to personal property are voidable."

Also, see *Levine v. Mallong Company*, 21 A. (2d) 852. Here the higher court held:

"The law is, of course, clear that where a contract to purchase is by the infant alone, he may avoid it and recover back money paid on account."

Right of Eminent Domain

Modern higher courts consistently hold that the right of eminent domain is condemnation and appropriation of private property for public purposes.

The amount of compensation to be paid for appropriated property will be decided by the court or a jury.

The latest higher court decision involving these varied points of law is *City of Eugene v. Johnson*, 192 Pac. (2d) 251. In this case a city filed suit through the right of eminent domain to appropriate approximately 51 acres of land owned by the Johnson Company. The city tendered into court the sum of $2,500, which it alleged was the reasonable value of the land sought to be appropriated.

Johnson contested condemnation of his land on these grounds: (1) The reasonable value of the land is $27,795; (2) the city does not require the complete 51 acre tract; (3) other sites are available and more appropriate, suitable and

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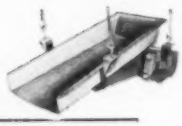

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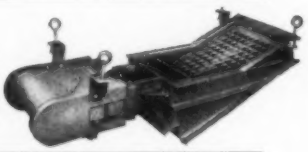

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adapted for use of the city on which to construct its waterworks improvements. The higher court refused to hold in favor of the Johnson Company, which was compelled to accept $2,500 in full payment for the land.

Engineer's Decision Is Final

Recently a higher court held that a city's engineer may finally decide upon real property to be condemned and appropriated for a "public use".

For example, in *City of Netchez v. Hender*, 41 So. (2d) 41, the testimony showed that a property owner named Hender filed suit to prevent a city from appropriating his real property. He testified that other sites were available and in fact more advantageous to the city and its inhabitants than the selected site.

During the trial, testimony was given that the city engineer had inspected 20 different sites, and that Hender's land was found to be the most suitable for the public use.

The higher court refused to reverse the decision of the city officials to condemn and appropriate Hender's land, saying: "Much of the testimony for appellee (Hender) was directed to the availability of other sites. A decision by the city that a particular site is best adapted to its proposed public use is legislative and is not reviewable by the courts. It is not to be restricted in its choice between two or more available sites."

Intentions of Parties

Considerable discussion has arisen from time to time over the legal question: When is a clause in a deed to property containing sand and gravel, or other nonmetallic products, valid which gives an easement pertaining to water rights? According to a recent higher court, the *intention* of the parties who signed the deed *is controlling*.

For illustration, in *Lynn v. Turpin*, 215 S. W. (2d) 794, it was shown that a deed contained a clause which provided that the grantor was to have the privilege of obtaining and using water from the property which he sold.

In subsequent litigation the higher court held that the grantor could continue to take water from the property because the testimony showed that when the deed was given, the parties so intended. The court said: "The paramount rule obtains that the intention of the parties is controlling."

Another important question of law decided by this court is as to whether an easement specified in a deed is effective with respect to the original purchaser *and all subsequent* purchasers depends on the original intentions of the parties as *expressed* in the *deed*.

Ultra-Hazardous

Generally speaking, a quarry company or other employer will *not* be held liable in damages for injuries caused private property by blasting operations, unless the testimony shows that the injury was caused by negligence of the quarry company. However, a recent higher court held that blasting in a densely populated area and in the vicinity of dwellings is an ultra-hazardous activity which re-

sults in the quarry company's liability regardless of the degree of care with which the blasting is performed.

For illustration, in *Alonso v. Rockaway Quarries*, 214 Pac. (2d) 50, it was shown that blasting operations in a quarry occurred in the heart of a community of approximately 300 homes and 200 yards from the quarry. Certain property owners sued the Rockaway Quarries for damages. The counsel for the quarry company argued that the company could not be liable because its officials and employees had used *great* care in setting off the explosions, and that the damage to the dwellings did not result from any negligence. However, the higher court held the Rockaway Quarries liable, saying:

"Here the evidence as to the time of the blastings by defendants (Rockaway Quarries) was without conflict; a large number of witnesses testified to the force of the explosions and their deleterious effect. . . Both damages and injunctive relief could be based on blasting in such surroundings as to cause the blasting to be ultra hazardous. . . Blasting in populated surroundings is considered an 'ultra hazardous activity' for miscarriage of which the company is held strictly liable in damages regardless of the degree of care with which blasting is performed."

Must Warn Minor

According to a recent higher court, employers are legally obligated to warn underage or minor employees of all known dangers of the employment. Failure to do so may cause the employer to be held liable for resultant injuries to the minor.

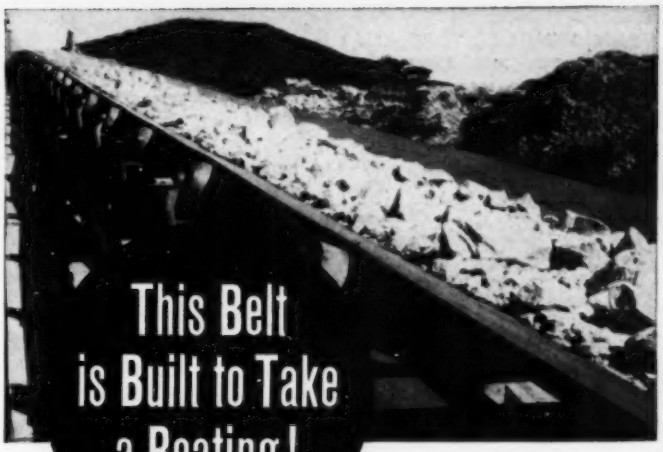
For illustration, in *Sena v. Sanders*, 214 Pac. (2d) 226, it was shown that an employee hired as a laborer slipped on the floor of a room where concrete blocks were being made, and while trying to right himself stuck his right hand in the cogs of a concrete mixer used by his employer to make the blocks, thereby receiving severe injuries. The employee sued his employer for heavy damages. The suit was based on the employer's carelessness and negligence (1) in requiring the employee to work as a laborer next to dangerous machinery without properly instructing and cautioning him relative to the danger and (2) in requiring him to work next to a concrete mixer which was unfenced and unguarded.

The lower court held the employer liable for $3,760 damages, and the higher court approved the verdict.

Validity of State Tax Law

Recently a higher court held that machinery, equipment, etc., used to transport sand, gravel, and other nonmetallic products is *not* exempt from a state's sale tax law.

For example, in *Tri-State Asphalt Corporation v. Glander*, 99 N. E. (2d) 366, it was shown that the Tri-State Asphalt Corporation is in the business of producing asphaltic concrete known as blacktop. The company uses a portable asphalt plant which is moved from job-site to job-site, so that the asphaltic concrete may be produced as near as



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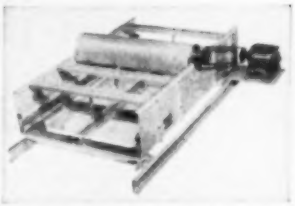

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possible to the place of use. In connection with the portable plant the company uses a crane which moves under its own power on rubber-tired wheels. It has a boom and a bucket, and is similar to a power shovel. The sand and slag used in the production of asphaltic concrete is manufactured both at its main plant and also at the portable plant.

The Tri-State Asphalt Corporation purchased a Wayne crane for the sum of $17,500. The state tax commissioner made a state sales tax assessment against the Tri-State Asphalt Corporation in the sum of $525 and a penalty of $78.75, or a total of $603.75 on the crane.

The company appealed to the higher court contending that the state could not legally collect a state sales tax because it was used directly in the production of tangible personal property and by processing.

The higher court refused to agree and ordered the company to pay the state tax, saying:

"It is difficult to conceive of products the processing of which does not require the transportation of ingredients to the place of processing as well as transportation of the finished products from the place of processing to customers or places of use. . . The fact that certain items of tangible personal property are required by law in mining operations does not in and of itself exempt or except from taxation the sale or use of such items for such purpose."

Silicosis vs Pneumonia

Considerable discussion has arisen from time to time over the legal question: If an employee has the disease silicosis and later contracts pneumonia, can the employee receive compensation under the State Workmen's Compensation Act? The answer is no.

For example, in *Safin v. Jones & Laughlin Corporation*, 70 Atl. (2r) 703, the testimony proved these facts: First, an employee died of lobar pneumonia; and second, he had been exposed to a silica hazard and had contracted silicosis. His widow sued for compensation under the State Workmen's Compensation Act, alleging that the pneumonia indirectly resulted from the employee's employment and the silica hazard.

The Commission agreed with this argument and awarded the widow compensation on the basis that the immediate cause was pneumonia and the primary cause was silicosis.

The higher court reversed the verdict and held the employee's dependent *not* entitled to compensation, saying:

"As silicosis does not generate pneumonia, its presence in rendering a debilitated system less able to withstand an unrelated disease does not create liability under the Occupational Disease Act, and compensation must be denied."

Circumstantial Evidence

Recently a higher court awarded compensation to dependents of a deceased injured workman who became insane and died. The court assumed that the em-

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ployee's insanity and death resulted from the injury which occurred within the scope of his employment.

For example, in *Graybeal v. Smith*, 225 S. W. (2d) 556, it was shown that one Lingerfelt sustained serious injuries in the course of his employment as a skip operator and rock driller in a rock quarry. The testimony showed that the rock and ground upon which Lingerfelt was standing gave way and he fell downwardly approximately 45 to 50 feet. Both of Lingerfelt's feet received multiple fractures, his ankles were crushed, he suffered serious spinal injuries and other bodily injuries. He remained in a hospital 30 days, after which he was released, and then was bedfast at home almost three months. One year and one-half later Lingerfelt became insane and died. His dependents sued for compensation, claiming that Lingerfelt's injuries and pain caused him to go insane. In holding in favor of the dependents, the higher court said:

"We think there is some material evidence to support the trial judge that the injury was contributory to his death. There is no question but that Lingerfelt suffered severe injuries as the result of his fall in the defendant's rock quarry."

Old Injury Accelerated

According to a recent higher court an employee who is already ill or disabled may recover compensation under the State Workmen's Compensation Act, if he sustains an injury within the scope of his employment.

For example, in *Cabell Concrete Block Company v. Yarborough*, 64 Atl. (2d) 292, it was shown that an employee of the Cabell Concrete Block Company had a sudden attack of paralysis when he fell while lifting a bag of cement.

The higher court held that although the testimony showed that the employee was suffering from a diseased or infirm condition does not necessarily bar him from a right to compensation under the State Workmen's Compensation Act, and that an award of compensation may be had in case of disability proximately caused by accidental injury which arises out of and in course of employment, and which accelerated or aggravated existing disease or infirmity.

Bankrupt Is Convicted

According to a recent higher court, a business owner can't practice fraud and escape conviction by going into bankruptcy.

For example, in *State v. Singleton*, 87 N. E. (2d) 358, it was shown that a dealer accepted deposit money from prospective purchasers. He paid to himself and some of his employees excessive salaries; and made to some of his employees and persons gifts of expensive automobiles and other expensive merchandise. Soon afterward the dealer was adjudicated a bankrupt.

The higher court convicted the dealer, and said: "From this evidence the jury was warranted in finding beyond a reasonable doubt that the representations were fraudulent in that the defendant never intended to carry them out".

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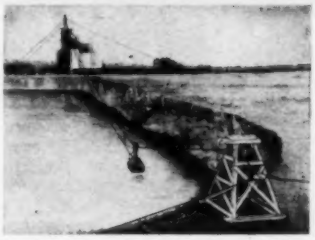

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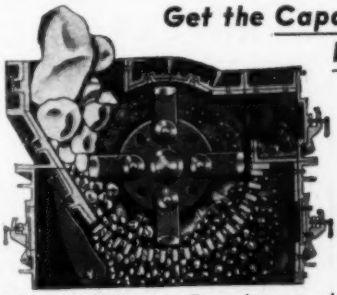

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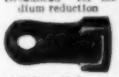

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CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 87711 (I)—Proposed to establish on sand (except blast, engine foundry, glass, moulding or silica) and gravel, in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight applies, from Riverton, Ind., to I.C. Railroad stations, such as Hovey, Griffin, Stewartsville, New Harmony, Poseyville, Martin, Armstrong, and Evansville, Ind., 126 cents net ton.

Docket 87712 (I)—Proposed to establish on crushed stone, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Osgood, Ind., to Cincinnati, O., 100 cents per net ton.

Docket 87721 (I)—Proposed to establish on crushed stone, in open-top cars, carloads, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Findlay, O., to Standley, O., 55 cents net ton.

NORTH PACIFIC COAST FREIGHT BUREAU DOCKETS

NC-1015 (Shippers proposal)—Amended on plaster, plasterboard and gypsum from Hanover, Mont., to Port Hill, Idaho, request for rates one cent per hundredweight higher than to Bonners Ferry, Idaho.

NC-1330 (Shipper)—Proposed to establish on lime rock, carload, Jacques and Orofino, Idaho, to Lewiston, Idaho, rate 4 cents per hundredweight, minimum 100,000 lbs.

NC-1334 (Shipper)—Proposed to establish on lime, carload, Evans, Wash., to Portland, Ore., rate of 20 cents per hundredweight, minimum 50 tons.

NC-1331 (Shipper)—Proposed to establish on lime rock, carload from Lime Mountain, Idaho, to Oswego, Ore., rate of $2.87 per ton.

PACIFIC SOUTHCOAST FREIGHT BUREAU PROPOSALS

Docket 968 (Shipper)—Lime, common, hydrated, carload from Sloan, Nev., to Reno, Nev., request for rate of 43 cents

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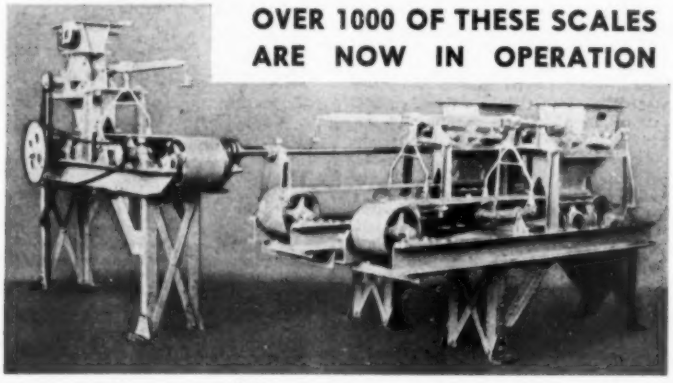

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TEXAS-LOUISIANA FREIGHT BUREAU

Docket 11057-TX – Crushed limestone from New Braunfels, Dittlinger, Ogden, Sneed, McNeil, and Old Round Rock, Tex., to Texas City, Tex. Shippers proposal to establish rate of 91 cents per ton of 2,000 lbs. on crushed limestone for neutralizing waste acids from New Braunfels, Dittlinger, Ogden, Sneed, McNeil, and Old Round Rock, Tex., to Texas City, Tex.; such rate not to include ExParte 162-166 increases.

FREIGHT TRAFFIC COMMITTEE—Trunk Line Territory Railroads

Docket TL M-661 (Carriers)—Proposed to establish on stone, natural (other than bituminous asphalt rock), crushed, not otherwise indexed by name, in Official Classification, in open-top cars, not protected by tarpaulin or other protective covering, carload minimum weight 90 percent of marked capacity of car, etc., from Bethlehem, Pa., to West Cressona, Pa., $1.50 per net ton, including ExParte 162-B, 166-C and 168-A increases, in lieu of present rate of $2.19.

Docket TL-M-663 (Shippers) – Stone, crushed and screenings, in straight or mixed carloads, in bulk, in open-top cars, (not including agricultural limestone or ground limestone, unburned, fluxing stone or firestone; or stone, coated with oil, tar, asphaltum or similar bituminous materials), carload minimum weight 90 percent of marked capacity of car, from Pleasant Gap, Pa., to Renovo, Pa., $1.40 per net ton including all increases, and to expire with December 1, 1950.

Docket TL M 686 (Carriers)—Fluxing lime, not ground, in bulk, carload minimum weight 70,000 lbs., from Annville, Avon, Lebanon, Myerstown, Palmyra and Swatara, Pa., to Phoenixville, Pa., $2.55 per ton of 2,000 lbs., including all increases, in lieu of present rate of $2.92.

Docket TL M-691 (Consignee) – Proposed to establish on ground or pulverized limestone, carload minimum weight 80,000 lbs. from Lime Crest, N. J., to Jersey City, N. J., $2.00 per net ton including all increases, in lieu of present rate of $2.56 minimum 60,000 lbs.

Docket TL M-704 (Shippers)—Proposed to establish on crushed stone, carload minimum weight 90 percent of marked capacity of car, from Bittinger, Pa., to P.R.R. stations Beaver Dam, Md., to Oak Hill, Va., $2.67; Makemie Park, Va., to Belle Haven, Va., $2.79; Exmore, Va., to Plantation, Va., $2.92; and Hunts, Va., to Kiptopeke, Va., $3.04 per net ton, including all increases.

Docket TL-M-708 (Carriers)—Stone, natural (other than bituminous asphalt rock), crushed, not otherwise indexed by name, in Official Classification, in open-top cars, not protected by tarpaulin or other protective covering, carload minimum weight 90 percent of marked capacity of car, etc., from Shainline, Pa., to West Point, Pa., 60 cents per net ton, including all increases in lieu of present rate of $1.16.

Docket TL M-711 (Carriers) – Stone, rough quarry, rip rap or rubble, carload

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- Lowered treatment cost due to highly efficient recovery
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The STEARNS Type "MWI" Magnetic Separator is equally adaptable for the recovery of media in Heavy-Media plants for the processing of all types of ores. This includes iron ores, fluorspar, rock products, coal, and similar materials. Specialized STEARNS Magnetic Separators are available for the recovery of other media such as magnetite.

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minimum weight marked capacity of car, from Bound Brook, N. J., to Atlantic City, N. J., $2.13 per net ton, including all increases.

Docket TL M-718 (Carriers)—Stone, natural (other than bituminous asphalt rock), crushed, in open-top cars not protected by tarpaulin or other protective covering, carload minimum weight per item 65 of New York Central Railroad Tariff 1910, ICC 342, from Watertown, N. Y., to Pulaski, Richland, Lacona, Mannsville, Pierrepont Manor, Adams, Adams Centre, and Rices, N. Y., 70 cents per net ton, including all increases.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket X-E-41-1238 (Shipper) — Proposed to establish a rate of 227 cents per net ton on crushed stone, carload, in open-top equipment, minimum weight 90 per cent of marked capacity of car from Dell Rapids and Sioux Falls, S. D., to Wareham, Neb. Not subject to ExParte 162-166-168 increases.

Docket X-E-41-1247 (Shipper) — Waste lime rock in open-top cars not protected by tarpaulin or other protective covering, minimum weight 100,000 lbs. per car, from Inland, Mich., to Barron, Rice Lake, Ladysmith, and Prentice, Wis., proposed 150 cents per net ton of 2,000 lbs. Not subject to ExParte 162-166 and 168 increases.

CENTRAL TERRITORY RAILROADS
Freight Traffic Committee

Docket 87659 (2)—Proposed to establish on stone, crushed, in bulk in open-top cars, and limestone, agricultural, unburned, in bulk in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when cars are loaded to full cubical or visible capacity, actual weight will apply.

Crushed Stone From Logansport, Ind., to — **Net Ton**

Nutwood, Ind.	101 cents
Lakeville and LaPaz Junction, Ind.	95 cents
Plymouth, Ind.	90 cents
Hibbard, Ind., Culver, Ind.	84 cents
DeLong, Ind.	79 cents
Kewanna, Ind.	70 cents

Agricultural Limestone From Logansport, Ind., to

Nutwood, Ind.	101 cents
Lakeville and LaPaz Junction, Ind.	95 cents
Plymouth, Hibbard, Culver, and DeLong, Ind.	77 cents
Kewanna, Ind.	70 cents

GENERAL FREIGHT TRAFFIC COMMITTEE
EASTERN RAILROADS

Bulletin G-2035 (Carriers) — Proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 lbs. from Piqua, O., to Hazard, Jewel Ridge, and Vicco, Ky., $3.34 per net ton in open-top cars and $3.84 per ton in closed cars, not subject to ExParte 162-B 166-C and 168-A increases, in lieu of present combination rates.

Bulletin G-2071 (Shippers) — To revise present commodity rates on sand, gravel, crushed slag and crushed stone, in open-top cars, carload minimum weight 90 percent of marked capacity of car, etc., from origins in Ohio, Western Pennsylvania and West Virginia adjacent to the Ohio border, to destinations in Ohio, to reflect basis of the following mileage scale:

	Cents per net ton (Include all Increases)
15 miles and under	65
20 miles and over 15 miles	70
30 miles and over 20 miles	80
40 miles and over 30 miles	90
50 miles and over 40 miles	100
60 miles and over 50 miles	110
70 miles and over 60 miles	120
80 miles and over 70 miles	130
90 miles and over 80 miles	140
100 miles and over 90 miles	150

Bulletin G-2086 (Shippers) — Gypsum rock, crude, carload minimum weight 90 percent of marked capacity of car, etc., but not less than 80,000 lbs., from Akron, Clarence Centre, Oakfield, Garbutt, Victor, Wheatland, and Wheatville, N. Y., to Cleveland, O., $3.23 per net ton in open-top cars and $3.56 in closed cars, including all increases.

GENERAL FREIGHT TRAFFIC COMMITTEE
EASTERN RAILROADS

Docket G-2099 (Shippers) — Proposed to establish on limestone, natural, ground or pulverized, unburned, minimum weight 60,000 lbs., from Gibsonburg, O., and other Northwestern Ohio Group 1 points to Edgewood, Md., $4.93 per net ton in closed cars and $4.43 in open cars, including all increases.

Bulletin G-2111 (Shippers)—Proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 lbs., from Carey, O., and other Northwestern Ohio Group 1 stations to Saxton, Ky., $3.83 in open cars and $4.32 in closed cars, including all increases, in lieu of present combination rates.

Doing TOUGH drilling fast
takes the speed and stamina of
ROK-BITS
CROWN CARBIDES
Crown cutting affords faster drilling than you have ever experienced. And in other ways Rok-Bits are engineered to better your footage at less cost. Note how air holes are placed for better blowing—the self-cleaning chip channels—the threads designed especially to match this bit's outstanding performance. Check your present bit performance against Rok-Bits. Request folder. Rock Bit Sales & Service Co., 2514 East Cumberland St., Philadelphia 25, Pa. Branch: Ashville, N. C. A complete line of pneumatic tool accessories.
Request Free book on regrinding carbide bits.
ROK-BIT—the only carbide bit with crown cutting edge

Trade Notes

P. I. Nagle

Perry I. Nagle has been appointed manager of pump sales for the American Brake Shoe Company's Manganese Steel Division. He fills the position left vacant by the death of Bradley S. Carr.

Mr. Nagle has been with Amsco for the last 27 years. He is the designer of the Amsco-Nagle pump. In his new position, he will act as sales manager for both industrial and dredge pumps. Headquarters of Mr. Nagle will continue to be at the Amsco Division, Chicago Heights, Ill.

The following officers were recently elected by the board of directors of the Vulcan Iron Works, Wilkes-Barre, Pa.:

Edward V. Melsha, president; John A. Roberts, chairman of the board; Harold R. Pittman, secretary and treasurer; and W. Emory Wood, assistant secretary and assistant treasurer.

Davey Compressor Co., Kent, O., announces three new dealership appointments: Frost Machinery Co., Ltd., Winnipeg, Canada; Hennessey-Forrestal Machinery Co., St. Louis, and Rosholt Equipment Co., Minneapolis.

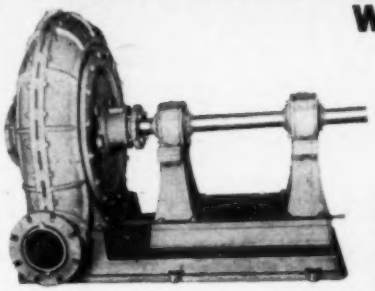
These dealers will handle all items of Davey manufacture, including "Air Chief" portable and industrial compressors, "Auto-Air" (truck-driven units), mine and railcar compressors, "Da-V-Lite" portable lighting units, Davey mobile machine shops and mobile field service units.

J. E. Ehlert, district manager of Euclid Road Machinery Company's New England territory for the last year has been transferred to the Southern California distict. He will be associated with Euclid's Pacific Coast branch and will represent Euclid in all California counties south of and including San Luis Obispo, Kearns and San Bernardino, in addition to Clark and Lincoln counties in Nevada.

A. E. Sorensen continues as manager of the Euclid Branch at Emeryville.

Appointment of Townsco Equipment Company as exclusive distributor for the entire state of Oklahoma has been announced by the Marion Power Shovel Company of Marion, O. Townsco has its main office in Oklahoma City and a branch office in Tulsa.

AMERICA'S HIGHEST PRODUCTION PUMP
NOW AVAILABLE with "NI-HARD" WEARING PARTS



6" heavy duty, bottom discharge, "Tell-Tale" Centrifugal Sand and Gravel Pump, equipped with Ball Bearings. (Patented).

THIS COMBINATION... of a near-everlasting metal alloy, (composed of iron, steel and nickel) with an already-recognized high pumping efficiency, makes "TELL-TALE" CENTRIFUGAL SAND AND GRAVEL PUMPS the most satisfactory in the aggregate pumping industry. Production and economy of operation guaranteed.

NI-HARD IS . . . an extremely close-grained white metal with a Brinnell hardness of .600. It has proven to be more resistant to abrasive wear than any other metal known to users of Centrifugal Sand and Gravel Pumps. NI-HARD Castings are so hard that they cannot be machined like cast iron and cast steel, but must be ground with special-grit emery wheels.

"Tell-Tale" Pumps can be had with standard, or regular Wearing Parts of semi-steel, or with Ni-Hard Parts. Write for descriptive Bulletin "P," stating size and type Pump in which you are interested.

PEKOR IRON WORKS, INC.
Lock Drawer 909 Est. 1892 Columbus, Georgia

YOU CAN'T AFFORD NOT TO USE...
PLASTILUBE
THE SUCCESSOR TO GREASE

In 4 short months, over 900 cost-and-quality-minded firms have bought and now specify PLASTILUBE, the successor to grease (compounded with Warren's I-45 and BENTONE, a product of National Lead Co.)

★ NEVER MELTS
★ MULTI-PURPOSE
★ COSTS LESS IN USE

You can't afford NOT to use PLASTILUBE... place your order or write for full details today!

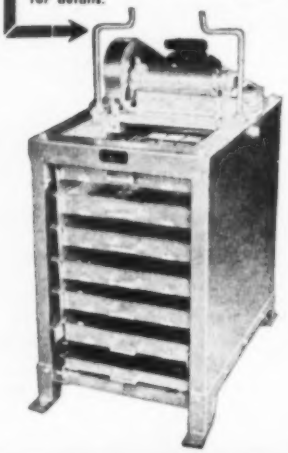
The 50th Anniversary Year

THE Warren REFINING & CHEMICAL COMPANY
CLEVELAND 15, OHIO

TEST YOUR PRODUCT TODAY

The GILSON Way

Fast, accurate, easy to operate, durable—that's the GILSON Mechanical Testing Screen for test-sizing samples of gravel, crushed stone, and similar materials. A GILSON Screen eliminates guesswork, and helps to insure a uniform product. Write for details.



GILSON SCREEN CO.
BOX 186 MERCER, PA.

F. L. Roewer of Merrick, Long Island, for the last 15 years associated with the International Nickel Company, has been named sales manager of Abrasive Alloy Castings Company, Bridgeboro, N. J.

F. L. Roewer

Mr. Roewer has been active in the promotion and sales of Ni-Hard, Ni-Resist and other nickel alloy cast irons for special duty purposes. Abrasive Alloy specializes in the production and sale of these special cast irons.

The retirement of L. P. Littell from the Salt Lake City sales office of Bemis Bro. Bag Co. has been announced. Mr. Littell has had over 40 years of service with Bemis, having joined the company at its Omaha plant in 1909. In 1918 he was put in charge of the Salt Lake City office, where he remained until 1932. In that year he was put in charge of Bemis's Denver sales office. He returned to the Salt Lake City office in 1944.

Marion Power Shovel Co. of Marion, O. has announced the appointment of William W. Wilkinson as sales representative for a territory embracing southern Indiana, southeaster Illinois, and all of Kentucky. Mr. Wilkinson will maintain headquarters in Evansville, Ind.

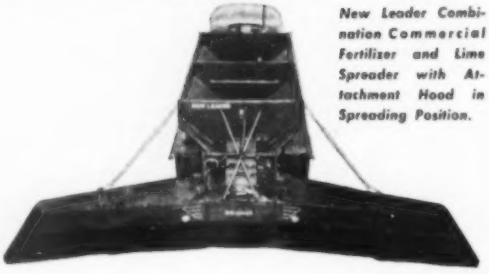
Melvin Kraft has been appointed sales representative in the New York City district. Mr. Kraft assumes his new position after more than a year and a half in the export sales department.

Caterpillar Tractor Co., Peoria, Ill., announced the appointment of Frank S. Foster, as assistant sales manager, Eastern Division. Mr. Foster is replacing Truman E. Sage, who is resigning to join the Caterpillar distributor for Alaska, Northern Commercial Company, Seattle.

G. J. Fowler

F. S. Foster

Gordon J. Fowler, district representative in the San Joaquin Valley, Calif., has been promoted to assistant sales manager, Eastern Division, a post formerly held by Mr. Foster.



New Leader Combination Commercial Fertilizer and Lime Spreader with Attachment Hood in Spreading Position.

Make More Money

with THE NEW LEADER

COMMERCIAL FERTILIZER AND LIME SPREADER

Get complete description and profit-making facts about the spreader that's guaranteed to spread any commercial fertilizer accurately and uniformly. Also handles crushed rock, chips and gravel. Reinforced welded steel frame; steel or wooden hopper. Simplified worm gear drive from truck power take-off; dust proof, oil-tight gear box. (Optional: conveyor may be separately driven from truck drive shaft to deliver correct number of pounds per acre—regardless of truck speed or gear used.) Accuracy of spread can be controlled to as little as 150 lbs. per acre. Mounts on any standard truck chassis. Sizes: 9', 11' 13' and 15'.

Write for complete illustrated literature.

HIGHWAY EQUIPMENT COMPANY, INC.

603 D AVENUE N. W., CEDAR RAPIDS, IOWA

Manufacturers of the World's Most Complete Line of Spreaders

HINGED PLATEGRIP

BELT FASTENER No. 500

FOR HEAVY CONVEYOR BELTS OF CHANGING LENGTH

These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from 3/16" to 1/2" thickness. They offer special advantages in mines, quarries or industrial setups where length of position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

Write for Circular

ARMSTRONG-BRAY & CO.

5394 NORTHWEST HIGHWAY CHICAGO 30

from the ground up—

there's a SCHRAMM Compressor to fit your air needs!

MODELS 20 and 35 . . . For Tire Inflation, Scaling, Impact Wrenches, Grease Guns, Paint Sprays and Road Markers.

MODEL 60 . . . For Jobs where large compressors are not required; Riveting, Tamping, Waterproofing and Insulating.

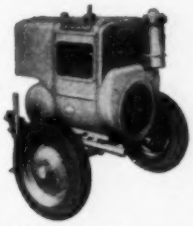
MODELS 60 and 105 . . . *Pneumatractor* Self-Propelled. For Trench Work, Loading, and all air applications.

MODEL 105 . . . Highly portable compressor for average construction jobs and auxiliary on large tools.

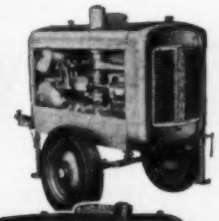
MODELS 210, 315 and 420 . . . Large Compressors for operating multiple tool combinations on big engineering projects.

TO GIVE YOU A COMPLETE PACKAGE

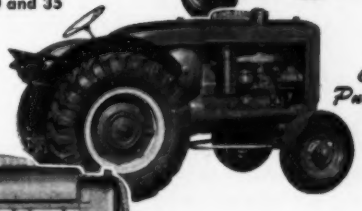
The SCHRAMM Line of Construction Tools includes: Rock Drills . . . Wagon Drills . . . Paving Breakers . . . Clay and Trench Spades . . . Backfill and Tie Tampers . . . Track Spike and Form Pin Drivers . . . Sheeting Drivers . . . Chain Saws . . . Concrete Vibrators . . . Paint Sprays . . . Tools for Breakers and Diggers . . . Air Hose and Accessories.



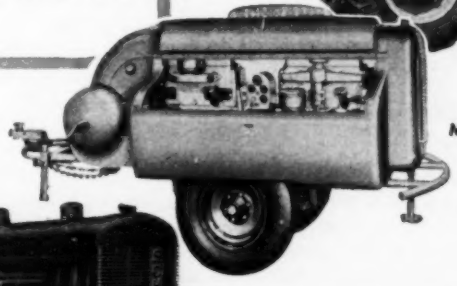
MODELS 20 and 35



MODEL 60



MODELS 60 and 105 *Pneumatractor*



MODEL 105

MODELS 210, 315 and 420

REMEMBER. There's a Schramm Air Compressor and auxiliary tools available for your many compressed air needs. For complete details, write us today.

SCHRAMM INC.

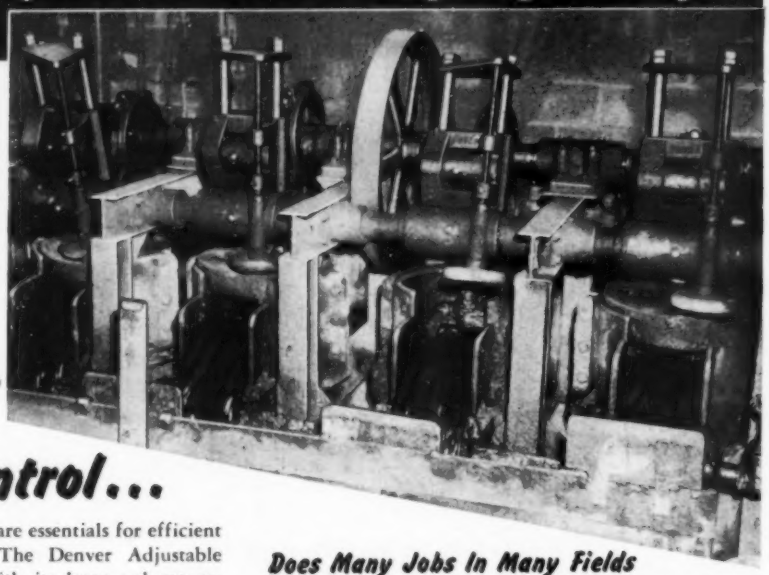
The Compressor People

WEST CHESTER • PENNSYLVANIA

Control Large Volumes of Pulp

WITH A

Denver *Adjustable Stroke* Diaphragm Pump



This 6" Quadruplex Denver Adjustable Stroke Diaphragm Pump is doing a real job at the Tamaqua Colliery of the Lehigh Navigation Coal Company, Inc.

Material... Minus 6 mesh washery refuse (Underflow from 75' diameter Denver Hydroclassifier)

% solids in pulp... 35-45
Gallons pulp per min.... 600
Tons solids per 24 hrs.... 1450-2000

Density Control...

... and pulp flow regulation are essentials for efficient industrial plant operation. The Denver Adjustable Stroke Diaphragm Pump, with its large volume capacity, ease of control, and rugged, long wearing construction, is an ideal unit for heavy duty "24-hour service."

Hand Wheel Controls Pulp While Pump is Running

Simply turning the adjustable hand wheel changes the length of stroke and immediately alters the pulp flow to the required amount, *while the pump is operating.*

Rugged Construction Gives Long Life And "24-Hour Service"

The Denver Adjustable Stroke Diaphragm Pump is sturdily built to give trouble-free service. Molded rubber valve seats and diaphragms are long wearing and may be quickly replaced with a minimum of shutdown time.

Does Many Jobs In Many Fields

In coal washing... in copper, phosphate, potash and other concentrators... and in industrial plants... large volumes of pulp are being handled "24 hours per day," month after month with these heavy duty Denver pumps.

Wide Range of Sizes, Large or Small Capacities

Sizes range from 2" to 6" in Simplex, Duplex, Triplex or Quadruplex units.

A 6" Quadruplex Pump, handling 60% solids at 4.2 specific gravity, has a rated capacity of 3,140 tons per 24 hours. A 2" Simplex Pump under similar conditions has a rated capacity of 80 tons per 24 hours.

Let us help you solve your pumping problems. Write today for Bulletin P8-B for additional information on the Denver Adjustable Stroke Diaphragm Pump. Other bulletins also available on a complete line of ore dressing equipment.

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

FLOTATION ENGINEERS

Our complete line of process equipment includes crushers, ball mills, classifiers, screens, feeders and flotation cells.

"The firm that makes its friends happier, healthier and wealthier"

DENVER • NEW YORK • CHICAGO • EL PASO • VANCOUVER • TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG • RICHMOND

DENVER EQUIPMENT COMPANY, 1408 17th St., Denver 17, Colorado

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT & QUARRY

Customer Confidence!

..THAT'S ONE REASON STEARNS KEEPS FORGING AHEAD

They believe in us—have confidence in us—depend on us—old and new customers, alike! Stearns takes just as much pride in this fact as executives of Ideal Cement Stone Company do in their Stearns 15-produced concrete blocks with "maximum density, load-bearing strength and fine appearance," which meet their 45-year standards of quality so well.

"STAR" CONCRETE BLOCKS VIBRATED PRESSURE PRECAST CONCRETE JOISTS

IDEAL CEMENT STONE COMPANY
OMAHA, NEBRASKA

OFFICE AND PLANT 31ST AND SPAULDING STS.
TELEPHONE PLEASANT 0456

May 2, 1950

Stearns Manufacturing Co.,
Adrian, Michigan

Gentlemen:

In January 1949 we installed our first Stearns "15" Block Machine. Our second "15" was installed one year later, January 1950. These two sturdy, fully automatic machines now produce 16,000 Concrete Blocks, 8x8x16" or equivalent, per shift with one operator at each machine.

Two Stearns 50 cu. ft. mixers, operated by one mixer man, supply the concrete. These mixers are equipped with Ni-hard blades and liners which outlast many times liners and blades of ordinary cast iron.

The dependability and stability of the Stearns "15's" and their capacity for producing quality Concrete Blocks are sources of pride and satisfaction. For 45 years our company has consistently stressed quality of product. The blocks produced on these machines have the maximum density, load-bearing strength and fine appearance which fully meet our quality standards. Also, loss of production due to spoilage at the machine is practically negligible.

Our dealings with Stearns date back to 1929. During these two decades the equipment we have gotten from you, the installation and servicing of it, and our business relations in general have been most satisfactory. We feel that the dependability and integrity of your company merits the confidence of the entire Concrete Masonry industry.

Yours very truly,

IDEAL CEMENT STONE COMPANY

Earl McClaren Vice Pres. & Secy.

A. Johnson Pres. & Treas.

Performance Is Perfection —Perfection Is Profit!— These two rugged, fully automatic, one-man Stearns "15" Concrete Block Machines in the Ideal Cement Stone Company plant, Omaha, Neb., now are producing 16,000 8"x8"x16" quality blocks or their equivalent per shift.

STEARNS
MANUFACTURING COMPANY • INC
ADRIAN • MICHIGAN

MODERNIZE WITH A STEARNS! BACKED BY MORE THAN A QUARTER-CENTURY OF KNOW-HOW!

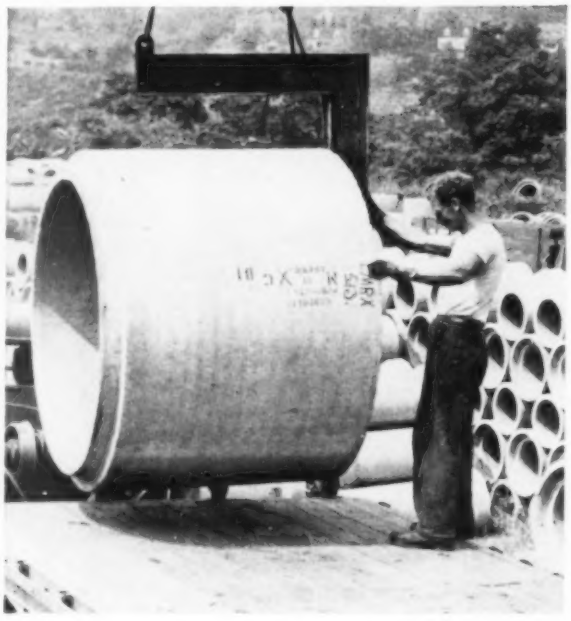
STEARNS 15 STEARNS 50 JOLTCRETES CLIPPER STRIPPERS MIXERS SKIP LOADERS TURNTABLES SINTERLITE

Ten Years Ago...

this test paving was laid in Minneapolis—the first commercial use of Atlas Duraplastic air-entraining cement. Badly scaled background section was made with regular cement. Foreground concrete was laid at the same time with Duraplastic. Here are both sections, photographed in July, 1949, after ten severe winters, heavy applications of de-icing salts—convincing proof of durability, lasting good appearance of Duraplastic. Longitudinal structural crack shows some raveling. Note perfect transverse joint.

A Decade of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

Today..... EXPERIENCE PROVES DURAPLASTIC*



makes superior concrete products

Year after year, Atlas Duraplastic air-entraining portland cement has grown in popularity. It has proved its value not only for concrete paving and structural use . . . but for machine-made concrete products as well. Manufacturers find it's ideal for concrete pipe, block, brick, drain tile, silo staves and other products.

In making products with Duraplastic, like the pipe shown here, manufacturers find they can use a damper mix—one that's more cohesive, holds together better and feeds easily through machines. Finished units exhibit greater resistance to passage and absorption of water. Appearance and face-texture are generally improved. Edges are clean-cut, truer.

Atlas Duraplastic complies with ASTM and Federal Specifications, calls for no unusual changes in procedure and costs no more than regular cement. Send for free new booklet, "A Decade of Duraplastic Air-Entraining Portland Cement." Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

OFFICES: Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Phila., Pittsburgh, St. Louis, Waco.

PQ-D-106

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

AIR-ENTRAINING PORTLAND CEMENT

MAKES SUPERIOR CONCRETE PRODUCTS AT NO EXTRA COST

NBC SUMMER SYMPHONY CONCERT — *Sponsored by U. S. Steel Subsidiaries — Sunday Evenings — June to September*

NEWS OF CONCRETE MANUFACTURERS

Washington Concrete Products Assn. Elect Slate at 21st Meeting

Ninety members and guests of the Concrete Products Association of Washington attended a most successful 21st annual summer meeting on June 16, 17, 18, at the Alderbrook Inn, a summer resort situated in the northwestern part of the state on the colorful Hood Canal.

On June 17 a short business session was held at which the following officers were unanimously elected for the 1950-1951 term: president, H. C. Lutes, Lay-rite Concrete Products, Spokane; vice-president, Talbot Campbell, Seattle Concrete Pipe Co., Seattle; secretary, R. W. Condon, Graystone Concrete Products Co., Seattle; treasurer, B. E. Harrison, Harrison Concrete Pipe Co., Tacoma; director (immediate past president), A. B. Metcalf, Columbia Concrete Pipe Co., Wenatchee; directors at large, Charles Delling, Puyallup Shope Brick Co., Puyallup, and A. P. Miller, Yakima Cement Products Co., Grandview.

The guest speaker, one of the leading authorities in the field of concrete products, Carl A. Menzel, manager of the Housing and Cement Products Bureau, Portland Cement Association, Chicago, gave a very interesting and informative talk titled, *A Plan to Promote the Sale of Concrete Masonry.*

In presenting his talk Mr. Menzel outlined with the use of motion pictures the proper and most effective methods of promoting the sale of concrete masonry, covering basic market information, advertising, selling and the use of displays.

Cement Reference Laboratory Plans 10th Inspection Tour

The Cement Reference Laboratory of the Bureau of Standards is preparing for its tenth inspection tour among cement testing laboratories. In general, only one visit is made to a given locality during a tour. Accordingly, if a laboratory desires this inspection, request should be filed at an early date, and should be addressed to the Cement Reference Laboratory, National Bureau of Standards, Washington 25, D. C. Request should clearly give the location of the laboratory to be inspected, the name of the person in charge, and should specify to whom the written report is to be sent.

As in former years, this inspection service is still quite closely limited to laboratories which regularly make the standard physical tests of hydraulic cements. The work covers the inspection of the apparatus used in such tests and includes the verification of compression testing machines. One of the conditions of this service is that each laboratory shall have at least one of its staff members available to demonstrate the standard cement tests at the time of the inspection, and shall have an experienced machine operator available to assist in the verification of the compression testing machine. Ample notice will be given prior to an inspector's visit.

It is expected that, before reinspection, a laboratory shall have remedied any deficiencies which were mentioned during the last inspection. The confirmatory report of the last visit should be reviewed, and request for reinspection should include mention of improvements made since.

C. J. French Jr., Appointed To Post on N.C.M.A. Staff

C. J. French Jr. recently joined the staff of the National Concrete Masonry Association as assistant engineer. In his new position, he will assist R. E. Copeland, director of engineering, in

carrying out the association's technical activities.

Mr. French was graduated from Colorado College in civil engineering. He also studied at Purdue University and Morgan Park Junior College.

The Nashville Breeko Block & Tile Co., reputedly one of the largest concerns of its kind in the South, will install a new unit to increase daily production of 8-in. blocks to 45,000 from the present 30,000. The new unit will cost approximately $100,000.

Basic Structural Concrete Design Is Subject Of New Engineering Text

The Ronald Press Company of New York has recently published a new text, *Reinforced Concrete Design*, by C. E. Large, professor of structural engineering at Ohio State University.

Designed for the undergraduate engineering, the volume treats all topics on an elementary level, to aid the student in achieving a sound knowledge of important fundamentals.

Included in the volume are chapters covering the basic subjects of the making, reinforcing, and strength properties of concrete, beam design, bond, shear, diagonal tension, anchorage, columns, and continuity. The text also covers the more practical problems of designing beam and girder floors, two-way and flat slab floors, and footings.

The 1947 American Concrete Institute Building Code is followed almost without exception in the problem discussions. The book is liberally supplied with sample problems, charts, code excerpts, and tables to augment the problems method. Price $5.50 per copy.

New Product on Market For Concrete Floor Repair

An iron asphalt patching material which produces long life repairs and makes possible easy, fast patching or resurfacing of worn concrete floors has been announced in a new 8-page illustrated bulletin by The Master Builders Company of Cleveland, O.

According to the manufacturer, this material, named "Masterquick," overcomes the problem of early break down under impact, particularly of feather edges, encountered with ordinary asphalt patching materials due to the use of 75 percent scientifically graded, ductile, metallic aggregate in place of the usual brittle aggregates.

Capitol Concrete Co. Builds 2nd Plant at Jacksonville

A new ready-mix concrete plant is now under construction on Lovegrove Blvd. in Jacksonville, Fla., for the Capitol Concrete Co.

The new plant will have a material unloading capacity of 250 t.p.h. and will permit the production of concrete at the rate of 100 cu. yds. per hour. The firm has operated a plant in Jacksonville at Johnston and Houston streets for several years.

Robert G. Campbell, 83, vice-president of the General Concrete Units Corporation at Pittsburgh, Pa., died on June 3 in a hospital of that city.

Group Insurance Plan For N.C.M.A. Members Announced by Dienhart

E. W. Dienhart, executive secretary of the National Concrete Masonry Association, recently advised member firms of that organization of a program for their participation in a group insurance plan sponsored by the Prudential Insurance Company of America. Participation is limited to regular members of N.C.M.A. engaged primarily in the manufacture of precast concrete building units, with the principal place of business in the continental United States, excluding the state of Texas. Subscription forms have been mailed to all association members.

To be eligible for the plan, a member firm must have at least three individuals who are eligible for the insurance, including at least two full-time employees other than partners or proprietors. At least 75 percent of such eligible individuals must enroll for the contributory hospital and surgical expense features of the plan. Other features include life insurance and accidental death and dismemberment insurance.

In his letter to member companies Mr. Dienhart pointed out that regulations of the various states prevent firms employing fewer than 25 persons from purchasing individually the non-medical, low-cost group insurance provided in the N.C.M.A. plan. In addition to making such insurance available to small organizations, it is anticipated that the N.C.M.A. group insurance trust, through the mass purchasing power of the association, will eventually result in lower unit costs than could be secured by small groups.

American Equipment Helps Speed Netherlands Housing

An unusual block manufacturing enterprise, prompted by the postwar shortage of houses and building materials in the Netherlands is being successfully conducted by the State Mines of that country. The effort is materially relieving the housing crisis which beset the mine workers.

Blocks are made from marl and waste products from the mines, adhesion being accomplished with but a small quantity of cement. From information available, it would appear that the "Bouvite" blocks are solid and do not have the core center typical of blocks in this country.

A special-type machine is used to form the blocks, which are then placed on wooden stringers which separate the layers. Multiple forks attached to a rack on either side of standard Clark bumper bars lift the entire unit load.

Green block are transported from the plant to drying sheds, where after drying they are individually checked, placed on single-deck pallets and stored to a height of about 120 inches. Because of the low ceilings in the drying sheds Hi-Lo stack uprights are used on the Clark truck lifts, thus providing lift of 63 in. without any increase in overall height. One fork lift is kept constantly in operation transporting block from plant to drying shed. Two others concentrate on loading delivery trucks.

Up to the present time, Koopman and Company, Dutch distributors for the Clark Equipment Company, have delivered five Clark Carloader 4,000-lb.-capacity fork-lift trucks to the State Mines. Delivery of several more is expected in the near future.

Accompanying photographs were taken at the "Emma" State Mine. They were supplied by Koopman and Co., Amsterdam, through the courtesy of Clark Equipment Co.

Smithwick Haydite Plant Dedicated at Portland, Ore.

Portland, Ore., was the scene of a festive occasion when the Smithwick Concrete Products Company of Portland and Eugene officially dedicated its new haydite plant.

Among those attending the ceremonies were Governor Douglas McKay of Oregon, civic officials of neighboring cities, and representatives of the state highway systems of Oregon and Washington. During the festivities the new rotary kiln was set in motion by Governor McKay.

Pontusco Corp. Purchases United Concrete Pipe Old-Line California Firm

H. Lloyd Nelson, president of Pontusco Corporation, announces the purchase by Pontusco of the United Concrete Pipe Corporation of Baldwin Park, Calif.

United Concrete Pipe Corporation is an old established manufacturer of concrete pipe, originally founded in 1918 as the United Concrete Pipe Company. In 1929 it became the United Concrete Pipe Corporation. United manufactures vertically-poured reinforced concrete pressure pipe, with a steel cylinder, a cage of reinforcing steel, or both. The firm also makes centrifugally-cast pressure pipe, either with a steel cylinder or with cage reinforcement. In addition, concrete pipe is cast without reinforcement for very low pressure service.

United has its main office, a large permanent plant for the manufacture of concrete pressure pipe, and extensive shop facilities for the manufacture of heavy specialized pipe making and handling equipment at Baldwin Park. Other pressure pipe plants of a permanent nature are located at Stockton, Cal., and Pleasant Grove, Utah.

Pipe is made in a wide range of diameters from 4 to 180 in. The smaller pipe is more generally used for sewer service and the larger sizes for water lines, sewers, and irrigation purposes. Recently United completed the manufacture of 9,000 ft. of 180-in. diameter reinforced concrete pipe for the U. S. Bureau of Reclamation's Central Valley (Calif.) project at Tracy, Calif. The pipe was used for triple discharge lines from the pumping station to the Delta-Mendota canal, 197 ft. above the pumping station.

Pontusco Corporation is a Delaware Corporation with offices presently located at Burlington, N. J., and New York, N. Y. It is jointly owned by the United States Pipe and Foundry Company and the Campagnie de Pont-a-Mousson of Nancy, France. It was formed in 1946 for the purpose of manufacturing concrete pipe and associated products in North America, Central America, and some countries in South America.

• Multiple forks on bumper bars lifting a load of "Bouvite" blocks.

• A delivery truck being loaded with one of the lift trucks.

Universal Names General Manager of Nashville Plant

Thurman Manley

The appointment of Thurman Manley as general manager of Universal Concrete Pipe Company's Nashville plant has been announced by H. X. Eschenbrenner, president.

Mr. Manley has been with the company for six years, working as sales representative and office manager at Nashville.

Universal's Nashville operation specializes in circular concrete pipe, flat-base concrete pipe, concrete block, and reinforced concrete river weights.

Settle 8-Day Strike at Connecticut Ready-Mix Plant

A ten-cent-per-hour pay raise, reduction in reporting time pay from 8 to 4 hours, and extension of the 60-day layoff clause to 90 days were the terms agreed upon when an 8-day strike at the Ready Mixed Concrete Co., Waterbury, Conn., was settled on June 9.

The A. F. of L. Teamsters' Union also stated that the terms call for a 2-year agreement, with a reopening of wage negotiations possible next February, and that the pay increase agreed upon was retroactive to February 15.

Kansas Firm Makes Blocks Of 90 Percent Common Soil

The Economy Building Block Machine Company of Topeka, Kansas, recently supplied the Gutting Construction Company with a building block machine that turns out "Terracrete" blocks made of 90 percent soil and 10 percent cement.

The blocks are made by subjecting the mixture of ordinary soil (pure clay or pure sand is not suitable), water, and cement to 2,000 p.s.i. pressure and then curing for five days.

Smithwick Supplies Haydite For Tacoma Narrows Bridge

Haydite from Smithwick Concrete Products of Portland, Ore., will be used to surface the decking of the Tacoma Narrows bridge, according to the Portland press. More than 40 cars of the material, which originates in quarries near Vernonia, Ore., will be required.

The Tacoma Narrows deck is 7,250 ft. long, and has a roadway width of 46 ft. 8 in. It is the third-longest suspension bridge in the world.

New Packaging Announced For Permalite Aggregates

Robert L. Cornish, advertising manager of Great Lakes Carbon Corporation, has announced that effective immediately, all Permalite products of the company will be packaged in bags with a modern, two-color design.

Permalite plaster aggregate will be packaged in 4-cu. ft. olive green kraft bags. Permalite concrete aggregate will be packaged in a 4-cu. ft. kraft bag of deep aquamarine blue, while Permalite acoustical aggregate will be packaged in dark brown 4-cu. ft. kraft bags.

• Houston Concrete Machinery Company's new plant, home of the Dixon concrete pipe machine.

Dixon Concrete Pipe Machines Manufactured in New Plant

The Houston Concrete Machinery Company, manufacturers of Dixon Concrete Pipe Machines and accessories, recently moved into a new plant at 6600 Washington Avenue, Houston, Tex.

Designed especially for producing the popular Dixon Model "B" and Model "C" concrete pipe machines, the new plant contains the most modern production and materials-handling equipment available. W. B. Dixon, owner of the Houston Concrete Machinery Company, states that facilities provided in the new plant assure faster production of pipe machines and accessories, with complete stocks of wearing parts immediately available at all times.

Houston Concrete Machinery Company features complete packaged pipe-making plants which include the pipe machine, mixer, conveyor, jackets, off-bearing carts, and related equipment. All machinery and equipment which may be purchased separately if desired, is assembled and thoroughly tested before delivery.

• New packaging for Permalite products.

R. H. Sutherland has announced the sale of the Sutherland Ready Mix plant and equipment, which he formerly operated with Claude Irwin near Pullman, Wash., to Doten Transit-Mix. Sale price of the plant was approximately $7,000. The Sutherland-Irwin partnership is retaining its ready-mix plants at Moscow, Idaho, and Colfax, Wash.

Idaho Block Producer Installs 6,000-Unit-per-Hr. Machine

Tom Brown, president of Pumice Products Company of Boise, Idaho, reports that a new $50,000 block machine has been installed at his plant west of Boise. The machine, largest of its type presently being manufactured, has a capacity of 6,000 blocks per hour.

Pumice Products began with a manually operated machine which produced 900 units per day.

Obliging Victims Furnish Tools for Safe-Cracking

Dunn Brothers Motors and Concrete Company at Pinckneyville, Ill., had the misfortune to be victimized by burglars recently. An ironical twist was the fact that the yeggs in breaking into the office safe, used the company's own tools. The loss was reported to have been $4,000.

At the Southeastern regional meeting of the National Concrete Masonry Association, scheduled for November 13 and 14, 1950, at Tampa, Fla., Jim Hart of the Hart Concrete Products Company, Tampa, will be in charge of local arrangements.

Rudolph C. Soens, owner of the firm of R. C. Soens and Son, concrete products manufacturers, died on July 5 at his home in Minneapolis, Minn. He was 55 years of age.

Pipe machine built for own use put Houston firm in machinery business

By WILLIAM M. AVERY

• W. B. Dixon, president of the Houston Concrete Pipe Company, beside one of the flat-bed trailer trucks used for making deliveries.

another ON THE SPOT report

WHEN W. B. Dixon, president of the Houston Concrete Pipe Company, Houston, Tex., built his first pipe machine some years ago, it was with no thought of eventually developing a full-scale machinery business. The operation of his own busy pipe plant, and a No. 2 plant, also located in Houston, for the production of a varied line of miscellaneous concrete products, was in itself a full-time activity. The first pipe machine and any subsequent ones he might build were to be strictly for his own use.

He adhered to this resolve for several years, but finally an acquaintance in the pipe industry, impressed with the performance of the machine, prevailed upon him to build just one unit for outside use. Others soon made similar requests, and by 1946 the company was unmistakably in the pipe machinery business. The machines are built in a well-equipped shop adjacent to the pipe plant, a proximity which has proved to be particularly valuable in carrying on development work. Improvements to the machines can be tested under full-scale operating conditions without the considerable time lag normally required to carry on field tests, and the initial model of a new machine can be thoroughly studied before placing it in production.

One of the first packer-head machines built by the company is still in operation at the Houston plant. It produces from 750 to 900 3-ft. joints of pipe in an 8-hr. day ranging from 4 to 12 in. in diameter. Larger units ranging from 15 to 60 in. in diameter and from 4 to 6 ft. in length are made on a tamp machine which was built and installed about a year ago. This machine was developed for the company's own use, and it will not be manufactured. Its productive capacity is approximately 100 tons per day.

Aggregates, consisting of pea gravel and concrete sand, are trucked to the pipe plant and stored in open stockpiles adjacent to the building. There are three Besser batch mixers (one 27-cu. ft. and two 18's) in separate concrete pits just outside the building proper but protected by a projecting canopy. These are charged from the stockpiles by means of a 2000-lb. capacity Hough loader mounted on a Case tractor. Regular portland cement in bags is used for all mixes, and no admixtures are employed. However, if the sand is inclined to be harsh, a small amount of blow sand is added to the mixes to obtain the desired plasticity.

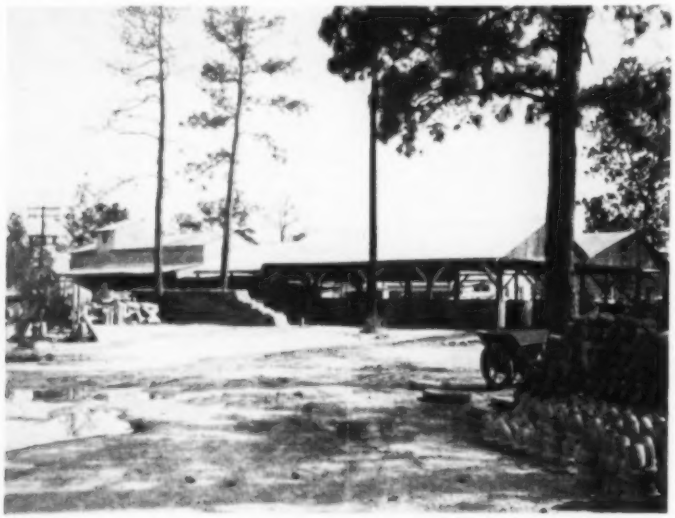
The feed hopper for the large pipe machine is charged by means of a conventional skiphoist, whereas the smaller machine is direct-fed by an inclined belt conveyor. Small pipe molds are handled between the machines and the curing areas by off-bearing carts of the company's own manufacture, but the large molds are generally handled with a Hyster "75" lift truck. The units are sprayed with water for five or six days to assure adequate curing.

After an initial curing period under roof to keep the units from drying out too quickly, they are moved to the storage yard at the rear of the plant. Six-in. tile are stacked on a four-wheel dolly and hauled to the yarding area by a small tractor. Other yard handling equipment includes a 3000-lb. Scoopmobile fork truck which is used for stacking.

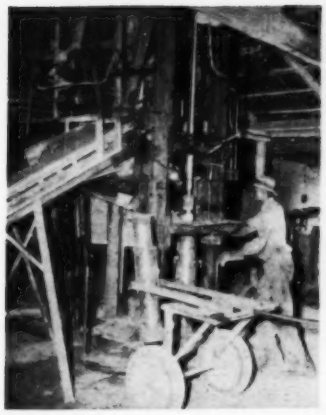
The capacity of the plant is approximately 135 tons per day, and most of the time it is operated at at least 60 percent of capacity. Since the principal demand is for small-diameter pipe, the packer-head machine is operated all the time, while the larger tamp machine is normally operated on an intermittent basis.

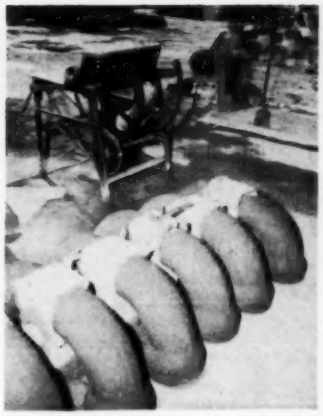
In separate sheds located on the

(Continued on page 136)

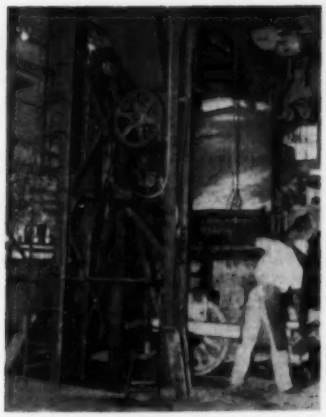


• A general view of the Houston Concrete Pipe Company's No. 1 plant at Houston, Tex., where the firm produces both concrete pipe and a varied line of machinery for the pipe industry.





• Left: Small pipe is produced on this packerhead machine, one of the early models built by the company.
• Center: Quarter bell-and-spigot bends made on the special machine visible in the background.



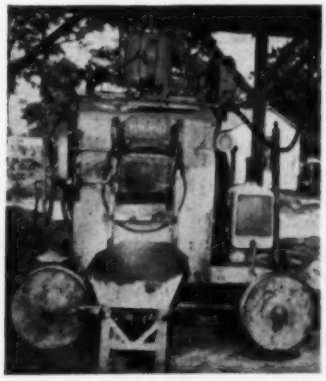
• Right: This tamp machine makes units ranging from 15 to 60 in. in diameter and from 4 to 6 ft. in length. Although developed and built by Houston, it is not included in the firm's line of equipment for sale to the industry.

• Aggregates are recovered from open stockpiles with this tractor-mounted loader and charged directly into the batch mixers.

• Large molds are transported between the tamp machine and the storage areas with this gasoline-powered lift truck.

• This 1000-lb. capacity gasoline-powered prime mover is used for hauling spilled concrete back to the mixers.

• Some of the many pipe "specials" which the company produces.



• The portable batch mixer from which concrete is wheeled to the various septic, grease-trap and water-trough molds.

The Control of Efflorescence In Colored Concrete Products*

By C. W. MOORE
Chief Chemist
Special Color Division
Mineral Pigments Corporation

EFFLORESCENCE, or bloom as it is commonly known, is the grayish white scum of varying concentration which forms on the surface of concrete products. Chemically, the efflorescence consists mainly of the partly soluble alkali metal salts which are bled to the surface of the product by capillary action during and after the curing period and deposited there when the water evaporates. Efflorescence is present in all concrete products, but is seldom noticed in uncolored mixes due to the lack of contrast between the grayish white bloom and the grayish white concrete. However, when the product has been colored by the introduction of an inert pigment, the efflorescence is readily seen against the contrasting background.

There are quite a few factors which contribute to the amount of efflorescence. The most important of these is the amount of soluble salts present in the concrete. These salts are mainly calcium, magnesium, iron, and other metal sulphates and chlorides, and are present in different quantities in all the components of concrete. The following table will illustrate a typical analysis of water soluble materials in colored concrete ingredients:

Pigment .....0.30 percent water soluble
Sand .....0.30 percent water soluble
Lime .....0.67 percent water soluble
Water .....0.20 percent water soluble
Cement .....2.00 percent water soluble

Using these figures in a typical concrete product formulation, we can determine the important sources of the water soluble material.

Formula	Percent Water Soluble in Ingredient	Total Weight Water Soluble from Each Ingredient	Percent Water Soluble from Each Ingredient in Total Mix
Pigment ..... 6 lbs.	0.3	0.018 lbs.	0.4
Cement ..... 96 lbs.	2.0	1.920 lbs.	42.7
Sand .....820 lbs.	0.3	2.460 lbs.	54.7
Water ..... 50 lbs.	0.2	0.100 lbs.	2.2
		4.498 lbs.	100.0

From this table it is obvious that the great majority (97.4 percent) of water soluble salts contributing to efflorescence are present in the sand and cement. Those figures are a specific example. They will vary a great deal in different localities, due to variations in sand deposits, water impurity, and cement supply.

We now have seen the sources of the undesirable soluble salts. In order for these salts to cause efflorescence, they must be carried to the surface of the concrete product while in solution and deposited on the surface when the water is evaporated. There are several outside factors which determine the amount of these salts which are carried to the surface. First, the quantity in solution is important. Since most of these salts are partially soluble, only a certain quantity will go into solution with a limited amount of water. Therefore, the greater the amount of water in a product the greater the amount of salts in solution. Time also determines the quantity which goes into solution. The longer the salts are in contact with water the greater amount will dissolve, up to the limits of solubility. Consequently, the longer it takes the excess water to evaporate from a product the greater the efflorescence.

The above factors determine the amount of salts dissolved. Before these dissolved salts can cause efflorescence, they must be carried to the surface. In the curing process of a concrete product the excess moisture is evaporated at the surface only. As the surface moisture is evaporated, it is replaced with moisture from the interior by means of the capillaries formed between the particles in the concrete. Excessive troweling will also carry the water to the surface, thereby increasing efflorescence.

Efflorescence can be reduced by following as much as possible the following procedure within the practical limitations of the product in the way of cost and versatility of machinery and process.

1. Use ingredients, cement, sand, water and pigment with the least possible soluble salts. Of these four, the cement and sand are the most important. Aggregate, either coarse or fine, which has been water washed, will contain less soluble salts. Aggregates such as crushed, washed and screened limestone or crushed blast furnace slag, are usually lower in water soluble content. The cement used can be selected, by analysis, to contain the least amount of water soluble material. Pigments used should be . . . specifically designed for use in concrete products by their rigidly controlled water soluble content.

2. Use such chemicals as active barium carbonate to react with the sulphates in all ingredients forming the insoluble and harmless barium sulphate. Our laboratory will gladly analyze samples of aggregate or water to determine their water soluble content and will recommend the quantity of barium carbonate required to inhibit efflorescence.

3. Increase speed of cure as much as practical within strength limitations by the use of the greatest possible drying air at lowest humidity.

4. Use minimum amount of water.

5. Keep surface troweling to the minimum.

6. Use hardening agents to allow greater pigment loading without loss of strength.

7. Use water-proofing agents or waterproof cement to intensify color and to prevent the return of water after cure is complete.

*A talk given before the Brikcrete Manufacturers of Western Pennsylvania on May 13, 1950, at Sharon, Pa. Member organizations are Niles Brikcrete Co., Niles, O.; Sharon Brick & Tile Co., Sharon, Pa.; Valley Brikcrete Co., Creighton, Pa.; Modern Masonry Products Co., Cochranton, Pa.; Masonry Products Co., New Brighton, Pa.; Pittsburgh Brikcrete Co., Pittsburgh, Pa.; Sligo Brikcrete, Sligo, Pa.; and Construction Products Co., Charlerol, Pa.

Hollow Floor Construction In Europe

By GEORGE W. HOFFMANN

another P and Q exclusive

IN the last 12 months Western Europe has taken a swing to improvements that feels and looks familiar to the American observer who has known the times of rugged individual efforts and pioneering accomplishments preceding the present age of planned economies and maximal securities.

A living and visible documentation of such Western European progress is seen, of course, in the construction of buildings, bridges, and enormous housing projects that rise above the cities of ruins and mountains of rubble which still are in evidence, especially in Germany.

Under such circumstances the human urge to survive and to rise out of such limitations has created ideas and improvements which move the visiting American with surprise and admiration.

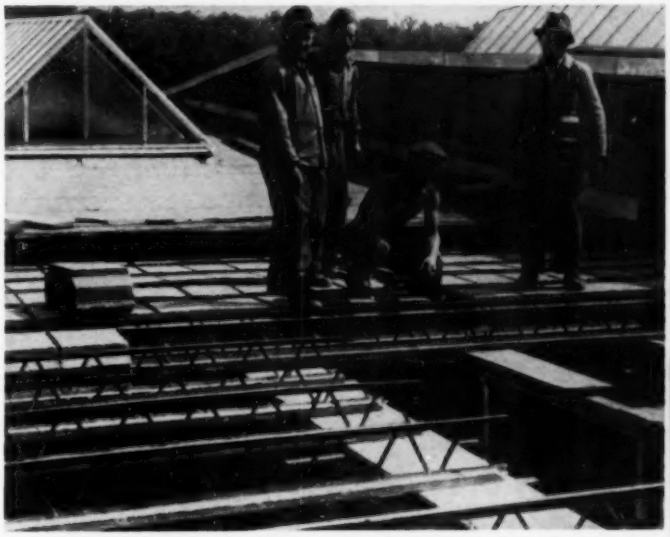
One finds that Western Europe, although pressed for housing, still looks to old-fashioned and utterly unnecessary building regulations, such as excessively heavy walls, unreasonably high roofing, and excessive weight-supporting floor tolerances.

In some respects, however, we find our European construction colleagues abreast of our own American construction methods. One striking accomplishment combining the ideas of an engineer with the work of a group of machinery manufacturers has developed the hollow floor and roof construction method described below.

Hollow floor construction is not new, and many good systems are used in our own country. The one argument against some of them is excessive weight, which requires special reinforcing, special concrete toppings over the actual masonry units, and consequently heavy foundation and wall construction.

In Europe this problem has been approached by the use of the assembly line method. A lightweight steel beam is made from standard T-iron and steel strip. Such beams are finished by having cast onto the lower rail a concrete bar which will fit with the hollow concrete floor units into a perfect homogeneous ceiling pattern that does not show the marks of oxidation or the lines of uneven fittings sometimes found in similar floor construction methods.

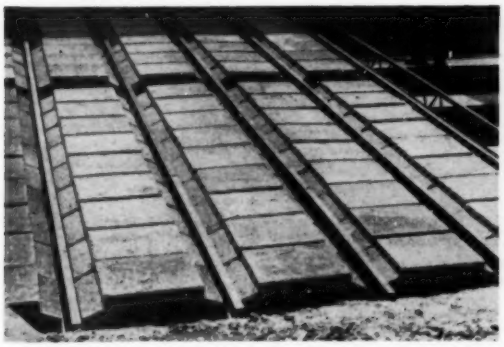
The other item in the picture is a 23- by 9¾- by 8-in. hollow concrete floor unit, (based on the 25-cm. standard to simplify construction calculations). Such a unit, made of pumice or other lightweight aggregate, weighs from 16 to 18 lbs. and requires for a normal floor span of 12 to 15 ft. a corresponding steel

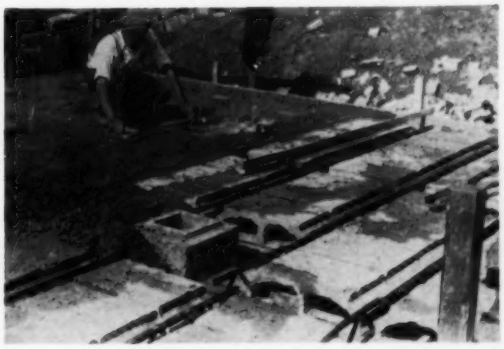


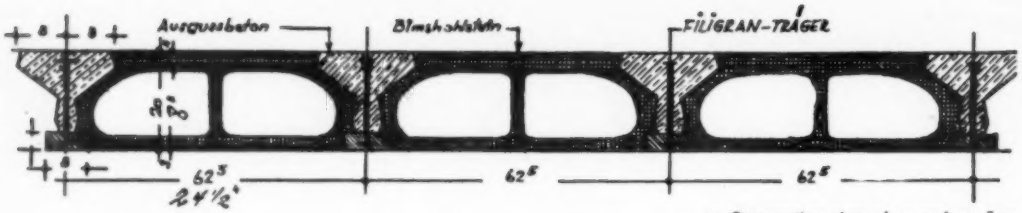
• Lightweight steel beams being placed in a roof of hollow lightweight concrete construction. Short girders will be supported by steel rods running crosswise and anchored in girders on both sides.

Below, left: a lightweight roof or floor in place. Note the open space permitting crosswise reinforcing for extra-heavy load-bearing requirements without interference with girders.

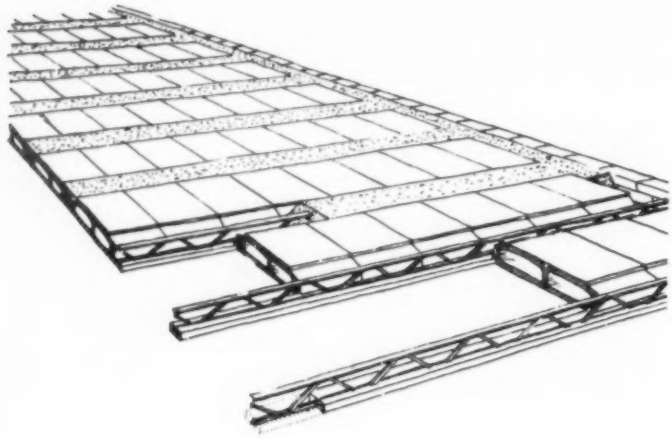
Below, right: Finishing the roof by grouting in with coarse concrete of good quality. Steel beam construction eliminates the need for covering the entire floor beyond the top surface of the hollow units.







• Cross-section view of a roof or floor, showing the method of laying the hollow units.



• Left: View of a partially constructed roof with girders exposed and grouting filling in the spaces between the rows.

beam or girder of minimum weight. For bungalow and mass housing construction this results in floor or roof construction of maximum advantage at minimum cost.

No complicated manufacturing plant is required, and the concrete units are made on standard machines. In laying the beams there is no need for special rigging; and for laying the floor the minimum of furring concrete is used. Moreover, the saving in time for installing this inexpensive flooring, as well as its extreme lightness, keeps wall and foundation costs low.

This floor and ceiling construction method, already used in many Western European cities and covered by international patent applications, has been one of the many steps in helping to rebuild the face of that part of Europe on which the sun of free enterprise is still shining.

Houston Concrete Pipe Co.

(*From page* 132)

same 5-acre property Houston produces pipe "specials," septic tanks, grease traps, and watering troughs. The company's own Dixon pipe bend machine is used for producing 4- and 6-in. eighth- and quarter-bends. Septic tanks are produced in sizes ranging from 500 to 2000 gallons. These, as well as the grease traps and watering troughs, are cast bottom up, using collapsible forms for the inner walls. Concrete for the various tanks and other "specials" is mixed with a Jaeger 14S portable mixer and wheeled to the molds.

In 1940 the company decided to expand its activities to include an even wider range of precast concrete products. Since the original pipe plant was already somewhat cramped for space, it was relocated at its present site on the west side of Houston, and the older plant was equipped for miscellaneous casting operations. Here the company produces 24- by 24-in. colored patio blocks, precast concrete steps and landings, lintels, joists and similar items. Joists are produced on a Kirk & Blum machine, and A. C. Horn Ayr-Trap is used as an air-entraining agent.

The company operates three flat-bed trailer-trucks for making deliveries in the Houston area, and also a winch truck for setting septic tanks. A 6-cu. yd. Ford dump truck is used for hauling aggregates to the two plants. Most of the output is sold within 100 miles of Houston. The company employs about 40 men in all its operations.

Houston's latest development in the machinery field is the Model "C" hydraulic packerhead pipe machine, all plates, packerheads, jackets, bell packers and wearing parts of which are interchangeable with the company's earlier Model "B" machine. The new machine produces 3- and 4-ft. lengths of 4- to 15-in. diameter bell-and-spigot pipe and 6- to 10-in. diameter tongue-and-groove.

In addition to the two pipe-making machines, the company also produces and sells fitting inserts, septic tank forms, pipe bend machines, mixers, conveyors, and off-bearing carts. The full line of equipment is made at Houston under the Dixon Concrete Machinery trade name.

Idaho Firm Utilizes Film To Advertise Pipe Products

Publicizing concrete products with movies provided a firm with good advertising and also entertained a local audience with an informative feature at Nampa, Idaho, when the Idaho Concrete Pipe Company presented a film at a Kiwanis meeting.

Exhibitors Pete Pendrey and Joe Nysingh showed the movies, which featured the manufacturing process, transportation, and installation of large concrete pipes. Idaho Concrete Pipe operates plants at Nampa and Caldwell, Idaho.

A. J. Cole of Chillicothe, Mo., has begun construction of a new concrete block plant, the City Block and Supply Company just north of the city on Highway 65. The blocks will be manufactured in 4-, 6-, and 8-in. sizes and will be made of haydite, limestone, and gravel. Limestone and gravel will come from quarries in the area, while the haydite will be shipped in from New Market, Mo.

James D. Maitland, president of the Colorado Builders Supply Company, Denver, Colo., was recently re-elected a director of the Concrete Reinforcing Steel Institute and a vice-president of the Steel Joist Institute at the joint convention of the two groups at Houston, Tex.

Tennessee Block Firm Develops Unique Kiln for Steam Curing Precast Lintels

By WILLIAM M. AVERY

THE Franklin Concrete Company of Franklin, Tenn., has worked out an unusual method of curing concrete lintels which we think many of our readers might adapt successfully to their own operations. It is simple, relatively inexpensive, and has the important advantage of separating lintel production from block production.

The lintels are made on a 12- by 20-ft. concrete slab located just outside the machine room of the plant. When the day's production of lintels has been completed, a tight-fitting hood, made of galvanized steel sheets welded to an angle-iron framework, is lowered over the entire slab, and steam is admitted through a flexible hose which is connected to one end of the hood. The temperature is allowed to rise slowly until it reaches about 180 deg., at which point the steam is cut off and the units are allowed to soak until production is resumed the following day.

The raising and lowering of the hood is accomplished by means of two chain hoists attached to the cross members of pipe frames located at either end of the concrete slab. Short lengths of pipe welded to the four corners of the hood slide freely over the vertical pipes in these frames to position and steady the hood when it is raised or being lowered. When the hood is down, it rests entirely on the ground adjacent to the slab.

This arrangement creates ideal conditions for curing, since condensation of steam on the inner surfaces of the hood supplies an abundance of moisture. Since the cubicle

• Howard E. Johnston (left) and Claiborne H. Kinnard are co-owners of the Franklin Concrete Company's plant at Franklin, Tenn.

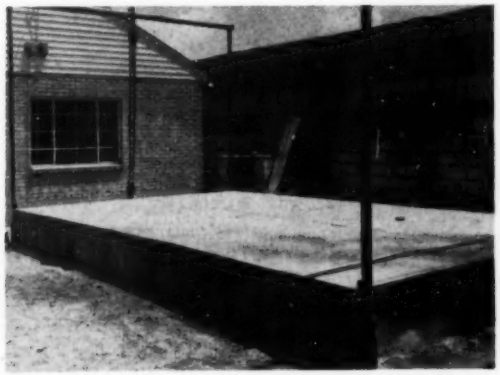
formed by the hood and the slab is relatively small, steam consumption is negligible. The same boiler that provides steam for curing block is used for the lintel kiln, to which steam is usually admitted at the end of the work day.

Concrete for lintel production is supplied by the 50-cu. ft. batch mixer which serves the block plant, the material being wheeled to the slab as required. The units are molded in special steel channel forms which are clamped together against spacers to make the various lengths desired. By packing the concrete with an air hammer it is possible to strip the form immediately, so that only one set is required for full production.

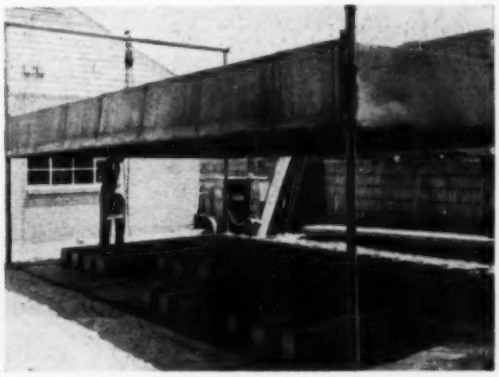
The slab can accommodate about 120 ft. of 8-in. lintels up to 11 ft. 8 in. in length. Daily production with one man averages from 150 to 175 units. Among the important advantages of the covered slab arrangement is that it permits modern steam curing without necessitating the use of pallets. The cover or hood has the additional advantage of giving both the workers and the product some protection from rain and sun. When the lintel kiln is opened in the morning, the units are placed on wood pallets and transported to the storage area with a fork lift truck.

The Franklin plant was built in 1946 for block production on a Graveley machine. Facilities were somewhat enlarged after a year or two, and early in 1949 a Lith-I-Block plain pallet machine was installed. The plant is now producing about 8,500 units per day in an 11-hr. work day, and the company confidently expects to reach an output goal of 2,000,000 units in 1950.

Both heavyweight units, incorporating crushed limestone, and lightweight Superock units are produced, the latter comprising about 40 percent of the total output. Superock is shipped to the plant by rail from Birmingham, Ala., while crushed stone and sand are purchased locally.



• Lintels are molded on a concrete slab just outside the main plant building. A sheet iron cover, supported by a chain hoist and sliding on pipe bents at either end, is lowered for steam curing.

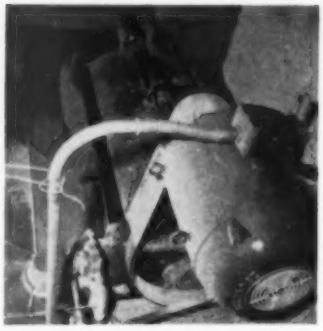


• A view of the cover for lintels in the raised position. The cover protects workmen and materials from the elements.

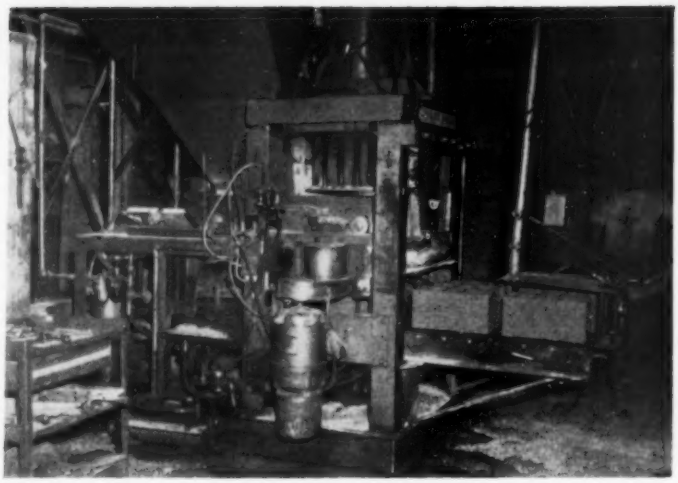
Three 60-ton bins are used for aggregate storage. These are charged directly from a ramp by a Scoopmobile which hauls the materials from stockpiles located on a concrete slab adjacent to the plant rail siding. Bagged cement is used exclusively.

The materials are batched by volume. Under the bin gates there is a vibrating screen with 1-in. openings which serves to remove debris, and to impart enough vibration to the batcher to assure uniform proportioning regardless of the amount of moisture in the materials.

Mixing is done with a 50-cu. ft. Gocorp batch mixer located in a shallow concrete pit below the batcher and behind the block machine. The capacity of this machine is sufficient to permit holding mixing time to a minimum of 6½ to 7 minutes, a procedure which the company reports has added 200 to 250 p.s.i. to the strength of the units, as compared with results obtained with 3½- to 4-minute mixes. A Buffalo meter is used to obtain accurate measurement of the water used in mixing. The mixer discharges into a skip hoist, which elevates the material to the supply hopper over the block machine.



• The 50-cu. ft. batch mixer is somewhat oversize to permit 6½ to 7 minutes of mixing time.



• This plain pallet block machine, installed early in 1949, produces at an average rate of 762 units per hour.

The Lith-I-Block machine is an automatic plain-pallet vibrating stripper which produces three 8- by 8- by 16-in. units (or their equivalent) in each cycle of operation. The major operations of the machine, including the pallet feed, are performed by air-oil cylinders. Production at the Franklin plant has averaged 762 units per hour since the installation was made. Two pallets at a time are offborne and loaded into steel curing racks with a conventional air-operated offbearer. The racks are transported to the nearby curing rooms with a gasoline-powered Truck-Man platform lift truck.

The kilns are smaller than normal for a plant producing 2,000,000 units a year, each of the 12 rooms holding six racks or 360 units. They measure 9½ ft. wide by 8 ft. long by 5 ft. 9 in. high. Since the kilns will accommodate only half of the plant's present daily output, they have been set up on a cycle that permits two loadings in each 24-hr. period. Steam is turned on as soon as the units have achieved initial set, and the temperature is brought up to about 180 deg. F. At this point the steam is cut off, the units are permitted to soak until it is necessary to clear the kiln for reloading. This results in a minimum curing cycle of 7½ hrs., and the company reports that the units are strong enough to be cubed without breakage. It was pointed out to us that the short cycle also makes

• Right: Cubes are piled three high in the storage yard with fork lift trucks. Brick, half block, and other units that cannot be picked up through cores are cubed on wood pallets.
• Below: The lift truck shown here is used to transport the units from the block machine to the kilns and from the kilns to the cubing area.

possible a 50-percent reduction in pallet and rack inventory.

Steam for curing has been generated by one 25-hp. coal-fired boiler, but at the time of our visit another unit of the same size was being installed. This doubling of boiler capacity will make it possible to bring several kilns up to temperature simultaneously, and will relieve the most serious bottleneck created by the sharp increase in productive capacity.

All production is formed into shipping cubes in a covered area in front of the curing rooms. Lightweight blocks are made up in cubes of 90 units, and heavyweight in 75-unit cubes. Most of the cubes are picked up through the cores of the bottom tiers with Erickson and Clark form lift trucks. Brick halfblock and other small units are cubed on wood pallets.

The Franklin firm has an unusually good record on sustained production. In the last year and a half only two days have been lost due to shutdowns for maintenance or repairs. This is attributed in part to the practice of carrying an unusually well-rounded stock of spare parts, and more particularly to the constant efforts of a capable maintenance man named Perkins Reynolds. It is his function to keep a close check on the performance and condition of all the equipment in the plant, and to make repairs and replacements before any trouble occurs that might interfere with production. Most of his work is done at night after the plant has been shut down. This system of preventive maintenance helps to keep production at maximum level day after day.

In marketing its increased output the company now employs a full-time salesman to call on architects and builders throughout the area served by the plant. As a service to customers there is direct (non-toll) telephone service from Nashville, which is 18 miles north of Franklin. Sales have also been stimulated by producing and stocking thin-shell units for floor construction, as well as certified straight Superock with a 4-hr. fire-retardent rating.

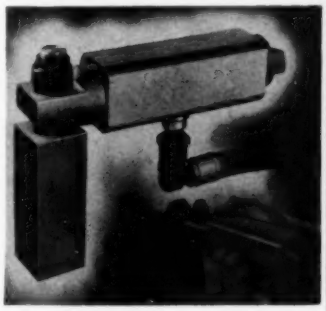
The company maintains from 250,000 to 300,000 units on its storage yard most of the time. Deliveries are made within the 50-mile radius served, using one company-owned flat-bed truck and as many contract units as required.

At Portland, Ore., True-Mix Concrete, Inc., will increase its output of ready-mix from 30 to 75 cu. yds. per hour with a new $43,000 mixing plant.

NEW MACHINERY and SUPPLIES

● Portable Air Vibrators

The Cleveland Vibrator Company 2710 Clinton, Cleveland, O., announced recently the availability of a new type "SAH" pneumatic vibrator assembly incorporating an alloy steel stud which facilitates insertion into the sleeve-type mounting bracket that is welded to the



assembly requiring vibration. According to the Cleveland Co., this method of attachment allows transfer of vibration to hoppers, bins, screens, flasks, concrete forms, etc.

Designed for continuous operation, type SAH air vibrators can be furnished in two standard sizes. The 1¼-in. size delivers approximately 2,500 hammer-like vibrations per minute on 100-lb. line pressure, and the 2-in. size delivers 1,250 blows per minute on the same pressure. The vibrators will operate on line pressures ranging from 50 to 100 p.s.i., and the 360-degree air intake swivel connector facilitates positioning and handling.

● 60-Cu. Ft. Mixer

A new double-capacity mixer has been added to the line of "Kelley" mixers, marketed by the Wittemann Machinery Company, Farmingdale, N. J.

The larger mixer, known as the Kelley "60-S" mixer, has a capacity of 60 cu. ft., as compared with the 30-cu. ft. capacity of the Kelley "30-D" model. The new mixer stands no higher than the smaller model.

As in the Kelley 20-T and 30-D mixers, the shell of the 60-S is of all-welded, curved steel plate construction. The shell and driving unit are mounted on heavy H-beam cross-braced skids. The shell is supported at both ends and at two intermediate points.

The open top of the mixer has a safety grating of welded flat steel bars to aid free passage of the aggregate. A shelf is attached to the charging side to permit convenient handling of extra bags of cement.

The unit is driven by a 30-hp., 220/

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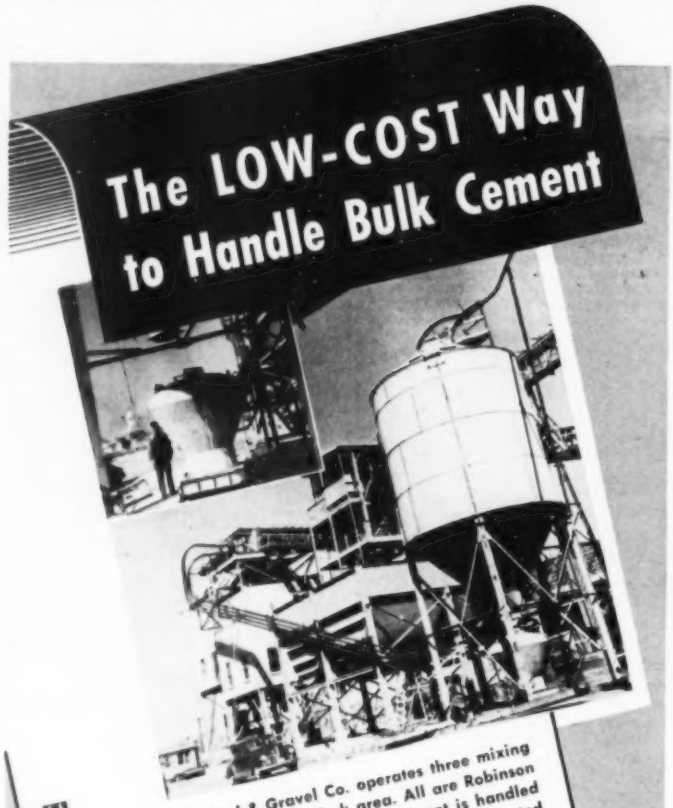
ROBINSON *Air-Activated* CONVEYOR



The Metropolitan Sand & Gravel Co. operates three mixing plants in the Metropolitan New York area. All are Robinson equipped. In the plant illustrated above, cement is handled from storage to the mixing plant by a Robinson Air-Activated Conveyor System. This Robinson Activator unit conveys either Portland or quick-setting cement to two batch mixers. Dual conveying pipe lines can be seen running to the top of the mixing plant in the background.

Cost reduction comes about in this way: pneumatic conveying figured out much cheaper than mechanical handling; the Robinson System would provide lowest power and maintenance costs. For the Robinson System uses only air as a source of power. It requires no motor-driven parts to feed the cement into the system. Thus, air requirements are low and maintenance is negligible.

If you have any cement handling operation, here are two ideas for consideration: (1) order your cement in bulk and (2) handle it the Robinson way. We'll be glad to help you in planning for idea No. 2.

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440-volt, 3-phase, 60-cycle "Master" gearhead motor with an 18:1 reduction and a heavy spur gear and pinion rated at 50 hp.

The 60-S is shipped completely assembled and ready for operation upon connection to power and water supply.

● Concrete Block Machine

The development of a new lightweight, power-driven "Twin-Block" machine for the production of concrete and cinder block is announced by the General Engines Company, Inc., Gloucester City, N. J.

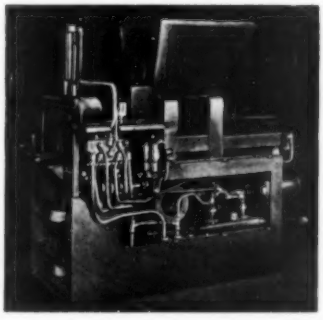
The capacity of the new General Twin-Block machine is 1,500 units per day, its weight is 600 lbs., and it is of welded, heavy steel construction. It combines electric vibrating, compacting, and troweling operations.

The vibrator assembly is self-aligning

and operates in sealed ball bearings. The removable core is designed for quick changing to different sizes of blocks. This new machine produces in one operation, two 8- by 8- by 16-in. blocks; four 4- by 8- by 16-in. blocks; two 6- by 8- by 16-in. blocks; or one 12- by 18- by 6-in. block. The floor space required is 30- by 42-in.

● Hydraulic Block Machine

An ingenious combination of hydraulics and electronics eliminates practically all manual effort from the manufacturing cycle of the new Hydro-Korpak block machine, according to the manufacturer, the Concrete Equipment Co., 531 Ottawa Ave., Holland, Mich. It requires the labor of only one operator, to re-



move the finished unit from the machine, and has a capacity of four to five blocks per minute.

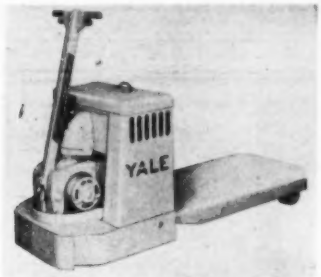
Pre-mixed aggregate is moved from a hopper atop the machine and placed in the mold box where by means of extreme hydraulic pressure and rapid-fire core oscillation, it is densified to the proper predetermined height.

Strategically located micro switches supply current to the gearhead motor which operates the cam shaft; at the precise time they stop and start the oscillating motor. They also energize the electro-magnetic brake which is attached to the oscillating assembly.

The Hydro-Korpak is regularly equipped to make nominal 8- by 8- by 16-in. block in full and fractional sizes. Attachments can also be supplied for the manufacture of other thicknesses, 4-in., 6-in., 10-in., and 12-in. Dimensions are modular, but the machine can be equipped for making the old standard sizes when desired.

● Lift Truck

The Yale & Towne Manufacturing Co., Philadelphia, Pa., announces a new "Stubby Worksaver" a full 6 in. shorter than previous "walkie" models of the same type. This 6-in. saving has been effected between the battery box and



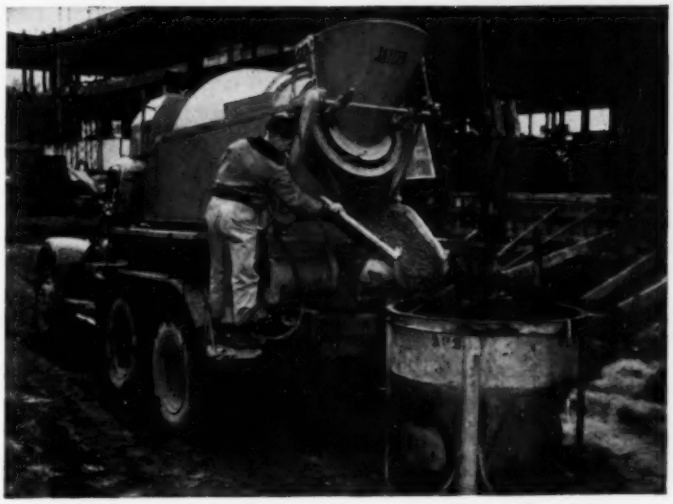
front edge of the truck, thus retaining full platform lengths for handling skids and skid bins.

According to Yale and Towne, development of the shorter Worksaver makes this type of truck adaptable for handling skids and skid bins in such confined areas as freight cars, street trucks, narrow aisles and elevators.

The truck is available in 4,000- and 6,000-lb. capacities. Standard platform lengths range from 36 to 72 in. in 6-in. increments. Heights of 6-, 7-, 9-, 10-, and 11-in. are available for handling skids of different heights. Platform widths are available in 19-, 24-, and 26-in. sizes.

Industrial Materials, Inc., a newly-formed company in Pasadena, Texas., has begun turning out concrete in its new batching plant. Personnel of the firm includes the following: Emmett Whitman, Valerie Whatman, W. J. Mills, and J. A. Straight. The latter is plant manager.

It's JAEGER built to give you BIGGER DAILY PAYLOADS



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by hundreds of dollars!

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MORE SPEED *to make more payload trips per day!*

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End-Loader or "Sealed Drum" Top Loader Types. Fluid drive (if you want it). Truck engine drive also available.

New 24 rpm drum-charging speed. End-loads dry material at rate of 10 seconds per yard.

New 60 lb. pressure jet. Distributes water at 100 gallons a minute.

Highest speed discharge of wet or dry concrete — 20-25 seconds per yard for 4" slump material, 1" slump in 60 seconds.

An instant-opening, instant-closing, positively self-aligning hopper.

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New "spider" drum drive — a major design improvement.

Power and 2-speed transmission in one unit. Permanent gear alignment.

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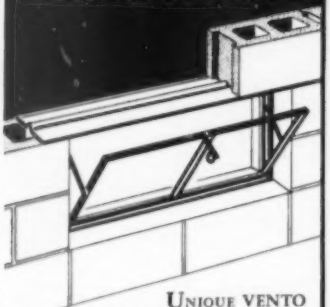
AGGREGATE SPREADERS • BITUMINOUS PAVERS • CONCRETE SPREADERS, FINISHERS

Simplified **WINDOW INSTALLATION — with VENTO STEEL LINTELS**



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Build profits by supplying this lintel and Vento Steel Casement and Basement Windows.

CHAMPION Window Positions

VENTO STEEL BASEMENT WINDOWS

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CHAMPION (left) —sturdy, yet delicately balanced. Three standard sizes — opened partially or fully (see illustration).

Thrifty Positions

THRIFTY (left) new Vento "economy" window. Three sizes, two open positions (see illustration).

45° Position

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There's PROFIT for you in these outstanding VENTO products. Write or wire for full details!

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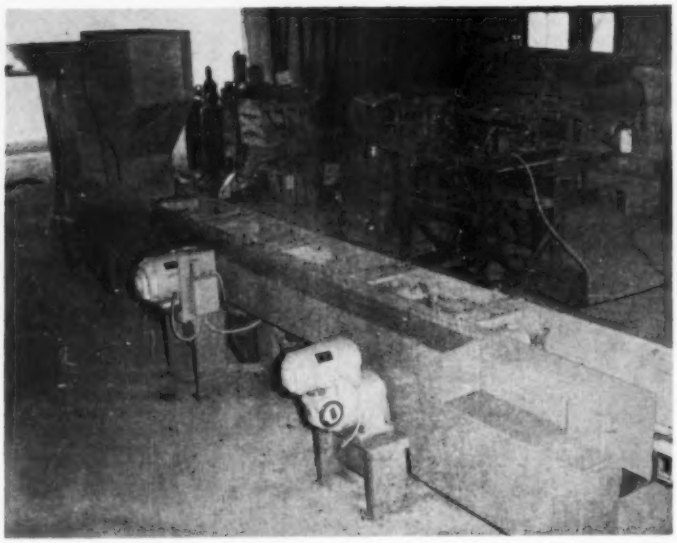

● Continuous Mixer

A multiple batcher continuous mixer for the manufacture of pumice block is offered by Leslie C. Miller Supply, Inc., Bedford, Q. The speed of the mix flow is controlled by a Sterling Speedtrol variable speed reduction gear motor which permits a range of 2 to 6 f.p.m.

The depth of the mixer sides is 17½ in. Rubber strips form a "sand-tight" seal at the bottom adjacent to the belt. The four-bladed rotating batchers are covered with semicircular guards above to control the direction of flow, with the bottom blade always moving against the mass on the belt. Rotation speed of these mixer elements is 45 r.p.m.

While the aggregate hopper is sta-

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D-p is the only air-entraining agent containing CERAMID. While D-p compares with the best air-entrainers marketed, it also provides Miracle Finish; Harder, Smoother and More Water Resistant Surfaces. Many advantages are obtained by the use of D-p in concrete placement, concrete finishing and concrete products manufacture.

Of major importance among the advantages of DISPERZO, is the correct amount of entrained air, less segregation of aggregate, reduced bleeding by better dispersion of cement and water, increased compression factor, improved workability and INCREASED CUBIC YARD PRODUCTION.

Of major importance among the advantages of CERAMID is more hardness, more water resistance, smoother finish, richer color, slower cure and reduced scaling.

D-p is a liquid—Easy to Use. D-p is stable—Safe to Use.
D-p is flexible—Affords control of entrained air.
D-p IS PROFITABLE TO USE!

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Capacity — 4000 pounds
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Capacity — 7500 pounds
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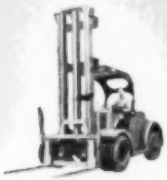

HYSTER 150
Capacity — 15,000 pounds
Width — 86 inches
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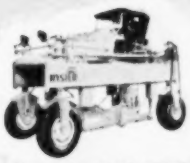
Capacity — 18,000 pounds
Width — 78½ in. and 90½ in.
Length — 176 inches



MH STRADDLE TRUCK
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Capacity — 10,000 pounds
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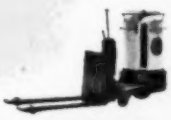

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Length — 86 in. and 110 in.
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Towing capacity — 20,000 pounds
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Capacity — 4000 pounds
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Capacity — 4000 pounds
Width — 42 inches
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Width — 28 inches
Length — 135 inches
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tionary, the cement hopper can be moved forward, to give the operator enough time to get the pumice as it is being violently turned over. On the six-batcher model a water jet is provided over each batcher. Proportion control for aggregate and cement is achieved by gates on both hoppers.

The model illustrated is 22 ft. long. The belt (¼-in., 5-ply Goodyear), is supported on 13 ball-bearing rollers, mounted on Fafnir flange ball bearings. A 5½-hp. Sterling motor drives the batchers through a 1-in. Diamond roller chain. The belt is driven by a ½-hp. motor through 1-in. Diamond roller chains. The latter is reduced to as low as 2/3 of a revolution to 1,800.

The mixer may be regulated to feed a block machine making from 300 to 1,200 units per hour.

● Materials Handling Truck

The "Kal-Truk," designed to accommodate two different types of materials-handling bodies, is a three-speed forward and reverse, heavy-duty truck for handling in the construction and industrial fields, as announced by its manufacturer, the Kalamazoo Manufacturing Company, Kalamazoo, Mich.

The Kal-Truk, with its 2/3-cu. yd. capacity is operated like a tractor and permits direct discharge of materials from hopper, bins, or mixers into its dump body.

This heavy-duty rear-steering Kal-Truk has two, close-coupled 6-in rear wheels equipped with 14 x 4.50 x 6-ply tractor tread tires. Its maximum maneuverability, at speeds up to 15 m.p.h., provides a turning radius of 78½ in. for the body from its rear pivoting point.

The Kal-Truk with dump body is

standard, and the interchangeable all-steel platform body is available as extra equipment. A tilting feature and all steel side and end gates facilitates quicker removal of load, it is reported.

The heavy-duty construction of the Kal-Truk, with its powerful 13-hp., air-cooled motor, has a load-carrying capacity of up to 3,000 lbs.

● Fork Truck

A new pneumatic-tired fork lift gas truck, the "Yard King," has been announced by the Yale & Towne Manufacturing Co., Roosevelt Blvd., Philadelphia 15, Pa.

Designed for use under adverse conditions, the steering mechanism is equipped with an inclined king pin which helps to protect it against road shock caused by uneven terrain, while cadmium plating on all undercarriage operating and steering connections reportedly reduces damage from atmospheric rust and corrosion.

In the Yard King, starting slip takes place in the Chrysler fluid coupling rather than in the clutch, lessening operator fatigue due to the fewer starts and stops and decreased necessity for shifting gears.

The Yard King is available in four sizes which have maximum load lifting

CHALLENGE

...the modern, streamlined truck mixer

• MIXES CONCRETE TO THE MOST RIGID SPECIFICATIONS
• GUARANTEED RATED CAPACITY

Leading, independent testing laboratories* have made extensive tests with Challenge Mixers to determine: 1, the uniformity of mixing; 2, the effect of the size of the charge on the quality of concrete produced; and 3, the effect of the time of mixing on the quality of concrete produced. In each test, results give absolute proof that highest or lowest slump concrete mixed in Challenge Mixers is well within ASTM (American Standards of Testing Materials) Specifications and is easily and quickly discharged . . . your complete assurance of being able to deliver specification concrete when ordered. These tests also guarantee accurate, rated capacity as stamped on the nameplate of each mixer.

See your local dealer for detailed information, or write, wire or telephone direct.

**We will be glad to send you a copy of these tests, however, your request must be on your company letterhead.*

Cook Bros. Equipment Co., 1815 No. Broadway, Los Angeles, California. Send me complete information on Challenge Mixers delivered in my area. Also the location of my nearest dealer.

NAME

COMPANY

ADDRESS

CITY STATE

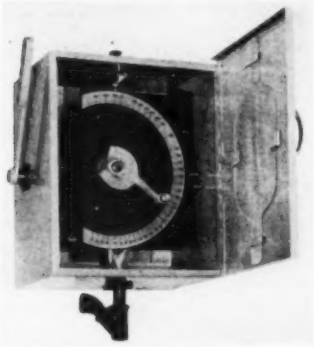
COOK BROS. EQUIPMENT CO.
EXCLUSIVE NATIONAL DISTRIBUTORS FOR
CHALLENGE
the modern, streamlined truck mixers

1815 N. Broadway, Los Angeles 31, Cal. Phone CApitol 2-9111

capacities ranging from 4,000 to 8,000 lbs. With an overall collapsed mast-height of 85 in., the new Yale truck attains a stacking height of 118 to 124 in., depending on the load capacity of the truck. Other lifts for sepcialized requirements are also available. A governor controls the speed of the truck to 13 m.p.h., with or without load.

● Air-Entrainment Dispenser

The Techkote Company of Inglewood, California, has introduced an automatic dispenser for air-entraining agents. Known as the "Techkote Mach Automatic Dispenser," the unit operates by passing the liquid agent through a bag



which is alternately opened and closed at top and bottom by a tripping mechanism. This release can be actuated either by hand, or by mechanical means in connection with the water discharge to the concrete mix. The quantity discharged can be easily dialed in units of ounces.

Some of the outstanding and exclusive features claimed for the new dispenser are no internal moving parts working in the air-entraining agent; no air vents; no pistons; no packing glands or nuts; no lubrication required; instant and accurate selectivity of quantity desired with a range of 3 to 40 ounces.

All of the working parts are made of stainless steel, while other metallic parts are treated for the prevention of corrosion and rust. The bearings are Oilite bronze.

● Perlite Plant

Over fifty 4-cu. ft. bags per hour is the capacity claimed for the new "Mid-Century" model of the Muehleisen Perlite Calcining Unit, marketed by Muehleisen Perlite Process, Inc., 1512 E. Lancaster, Fort Worth 3, Tex.

This new unit features the Brown "Electronik" proportional controller to maintain proper operating temperatures, an important point in the perlite process. The Muehleisen process kiln is automatic, and will operate on natural or bottled gas or with additional equipment on No. 1 or 2 fuel oil.

The Muehleisen unit requires a building space about 120 ft. long, 60 ft. wide, and 35 ft. high.

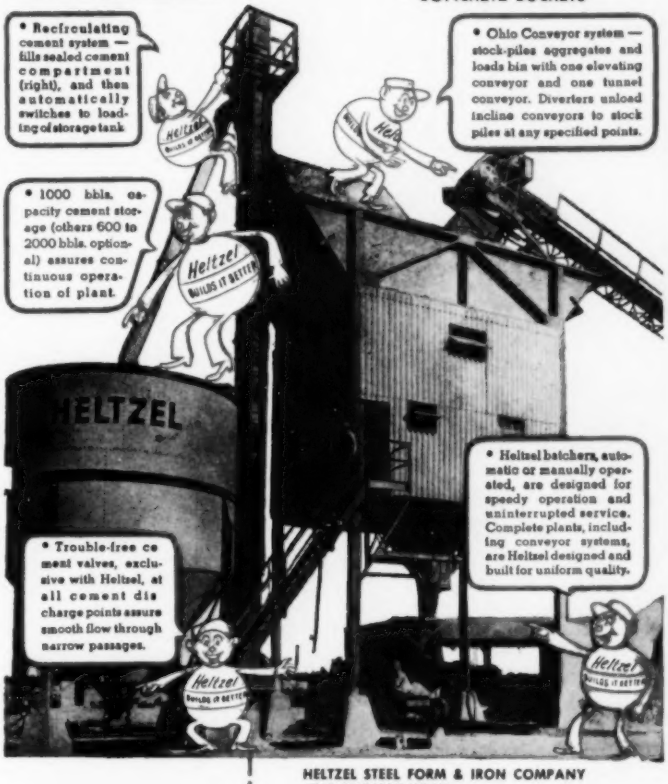
Heltzel BUILDS IT BETTER

HELTZEL

SUPERIOR *Batching Plants*

• More efficient batching plants will effect savings for you in operation and plant costs. Heltzel's specialized engineers work out your specific problems on both stationary and portable installations, ranging in capacities from 30 to 500 tons. Why not let a Heltzel representative explain exclusive features and Heltzel's better construction.

- CENTRAL MIX PLANTS
- TRANSIT MIX PLANTS
- BULK CEMENT PLANTS (Portable and Stationary)
- AGGREGATE BATCHING PLANTS (Portable and Stationary)
- CONCRETE BUCKETS


• Recirculating cement system — fills sealed cement compartment (right), and then automatically switches to loading of storage tank.
• Ohio Conveyor system — stock-piles aggregates and loads bin with one elevating conveyor and one tunnel conveyor. Diverters unload incline conveyors to stock piles at any specified points.
• 1000 bbls. capacity cement storage (others 600 to 2000 bbls. optional) assures continuous operation of plant.
• Heltzel batchers, automatic or manually operated, are designed for speedy operation and uninterrupted service. Complete plants, including conveyor systems, are Heltzel designed and built for uniform quality.
• Trouble-free cement valves, exclusive with Heltzel, at all cement discharge points assure smooth flow through narrow passages.
HELTZEL

WRITE FOR BULLETIN

HELTZEL STEEL FORM & IRON COMPANY
1760 THOMAS ROAD
WARREN, OHIO, U. S. A.

Please send information regarding:

Stationary Batching Plants ☐ Road and Airport Forms ☐
Portable Batching Plants ☐ Curb and Gutter Forms ☐

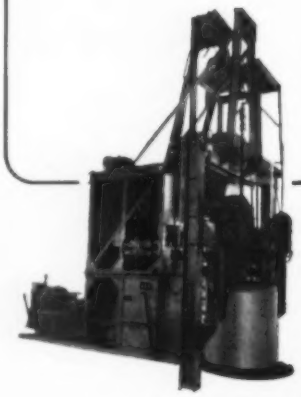
FIRM _____
ADDRESS _____
CITY _____ STATE _____
SIGNED _____

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO · U. S. A.

yes, you can

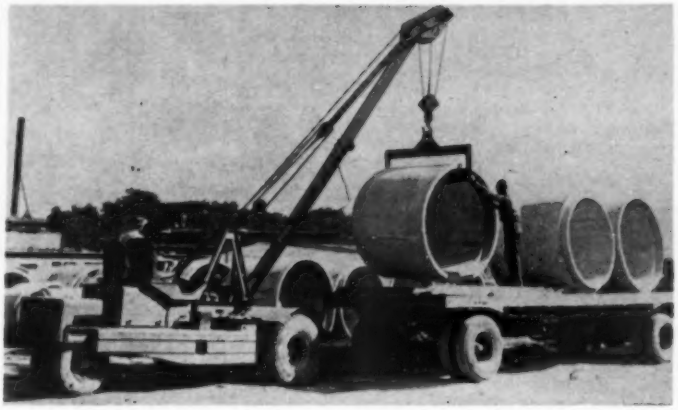
Buy or Lease

this Universal Concrete Pipe Machine



★ You needn't lay out the purchase price to begin enjoying the production and profits of this great machine. Leasing arrangements are possible on terms that assure profitable operation. The Universal Pipe Machine has set new higher standards for efficiency. It makes more pipe and better pipe with fewer man hours. Because it true-tamps at the incredible rate of 680 strokes-a-minute, you use a drier mix, get stronger pipe that handles with less damage, requires minimum curing. One of the four sizes (5"-24", 6"-48", 12"-60", 24"-72") will meet your requirements. Ask about the *Universal Lease Plan.*

UNIVERSAL CONCRETE MACHINERY CO.
297 South High Street Columbus, Ohio



● Portable Crane

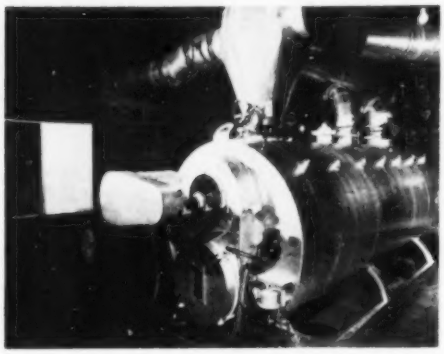
The ability to lift, carry and place loads of 1,000 to 20,000 lbs. is one of the advantages claimed for the "Krane Kar" by its manufacturer, the Silent Hoist and Crane Co., Brooklyn 20, N. Y.

Equipped with front-wheel drive and rear-wheel steering, the Krane Kar is obtainable in 3,000-, 5,000-, 10,000-, and 20,000-lb. capacities and can handle hook, sling, grab, and pallet loads. Attachments are available to adapt the Krane Kar to a variety of special applications.

The Krane Kar can be equipped with either gasoline or diesel power, pneumatic or solid rubber tires, and 9- to 37-ft. solid or telescopic booms.

For the 5,000 lb. capacity "Model A," the manufacturer lists the following specifications: four forward speeds, 2¼ to 15 m.p.h.; reverse speed, 2 m.p.h., or with a special transmission the same as the four forward speeds; two hoisting hook speeds, 50 to 80 f.p.m.; and a boom swing of 180 degrees in 15 seconds. The three other models have similar characteristics commensurate with their load capacities.

A "Sure Cure" for Concrete Curing Troubles!



EXTRA-EFFICIENCY FEATURES of the Modern EMMONS Method:

- Results compare favorably with 28-day curing under wet burlap at 70° F.
- "Package" unit is designed for normal curing capacity of 30,000 units.
- Fully automatic electric programming controls provide for individual time cycles on a selected group of five kilns.
- Automatic off and on operation assures admission of enough steam to envelope all the blocks in the kiln without raising the temperature at any of them too fast.
- Same "package" unit can deliver very high temperature saturated steam for flash drying.
- Low maintenance cost.

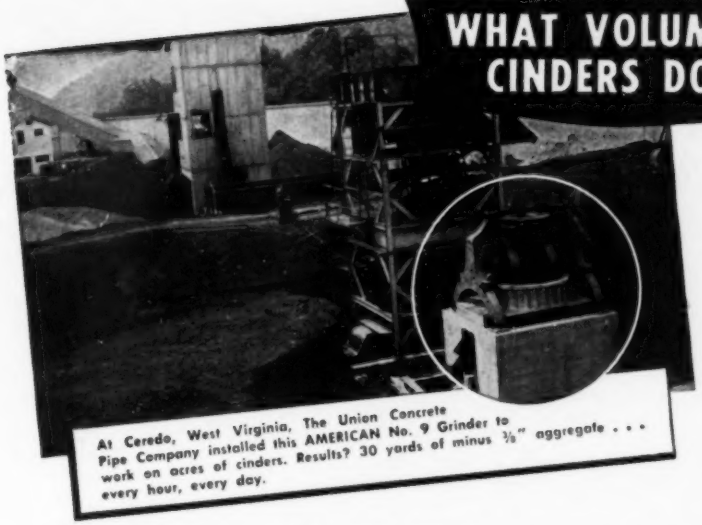
R. D. EMMONS CURING SYSTEM *is*

Better! Faster! Cheaper!

Mfrs. of
STEAM BOILERS
AUTOMATIC FIRING EQUIPMENT

R. D. EMMONS • 303 Melrose Ave., Syracuse 6, N. Y., Phones: 9-6200, 9-8363

WHAT VOLUME OF GROUND CINDERS DO YOU NEED?



At Ceredo, West Virginia, The Union Concrete Pipe Company installed this AMERICAN No. 9 Grinder to work on acres of cinders. Results? 30 yards of minus ⅜" aggregate . . . every hour, every day.

Select from 8 AMERICAN Grinders Hourly Output 4 Yards to 75 Yards!

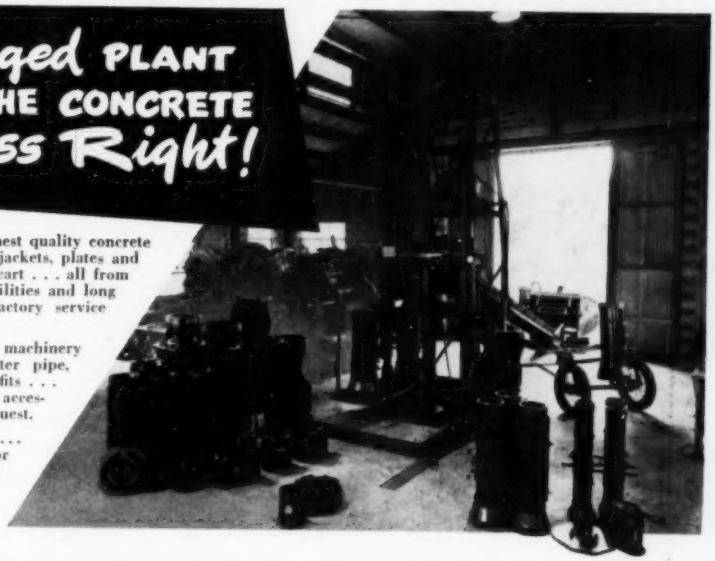
Write your own ticket for your plant's cinder-grinding requirements . . . one of the 8 AMERICAN Grinders will give you the output needed . . . deliver minus ⅜" mesh aggregate without additional separation! Your AMERICAN Grinder will require minimum maintenance . . . will conserve power . . . will help produce low-cost, top-quality cinder block. Write . . . wire . . . phone . . . ask for an AMERICAN grinding expert to help you lick your problem.

CAPACITIES . . . YDS. PER HOUR

No. 5 4	No. 9 30
No. 6 6	No. 482 35
No. 7 12	No. 418 50
No. 8 20	No. 384 75

American GRINDERS by
W. A. RIDDELL CORP.
BUCYRUS, OHIO

THIS Packaged PLANT PUTS YOU IN THE CONCRETE PIPE BUSINESS Right!



Everything needed to produce highest quality concrete pipe . . . mixer, conveyor, machine, jackets, plates and parts, right down to the off-bearing cart . . . all from *one* manufacturer whose modern facilities and long experience assure completely satisfactory service from all equipment.

For the very best in concrete pipe machinery . . . machinery that produces better pipe, faster, at lower costs and higher profits . . . buy DIXON Pipe Machinery and accessories. Complete information on request.

Illustrated is the Dixon Model "C" . . . a hydraulic, packerhead machine for making Bell & Spigot or Tongue and Groove Pipe up to 18" in diameter, in 3 and 4 foot joints. Also adaptable to 15" and 18" Grease Traps.

HOUSTON CONCRETE MACHINERY COMPANY

Plant:
6600 Washington Avenue

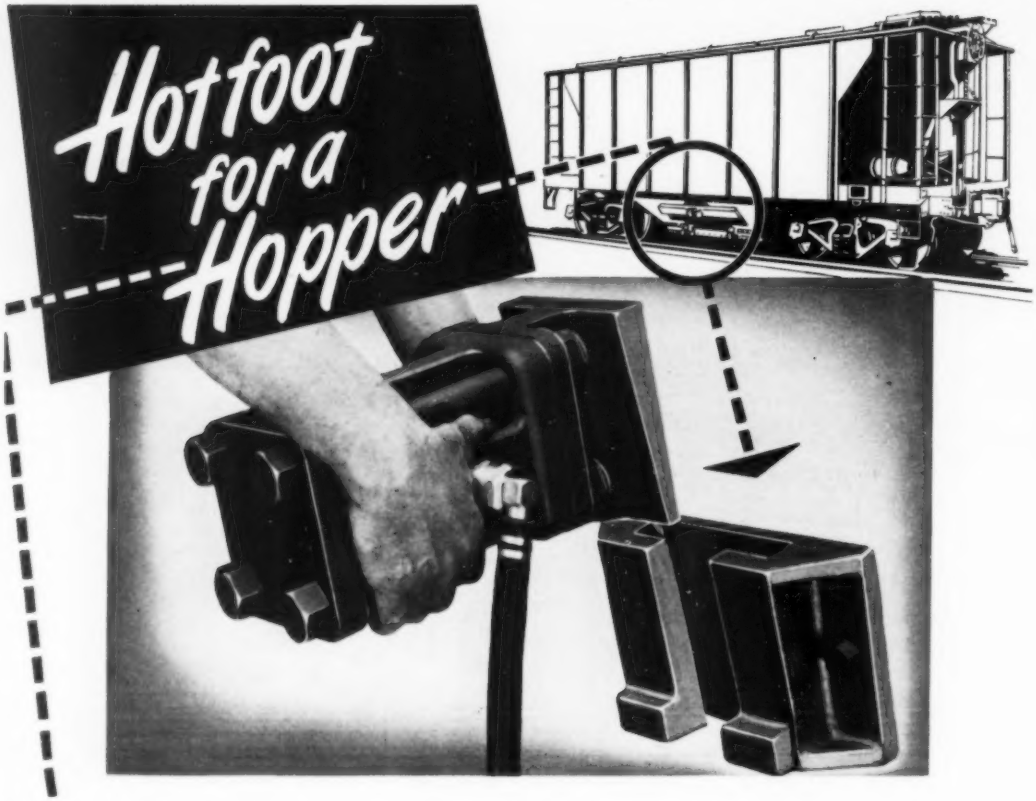
Office and Mailing Address:
116 Heights Blvd.

HOUSTON, TEXAS

Dixon Concrete Machinery

Manufactuurers of: Dixon Pipe Machines, Septic Tank Forms; Pipe Bend Machines, Dixon Conveyors; Dixon Mixers, Off-Bearing Carts

Hotfoot for a Hopper



GIVE that stubborn material a 'hotfoot' with a Cleveland Type LSRR Air Vibrator and get it moving on the double. Simply slide the vibrator into the bracket that is standard equipment on most *covered* hopper cars, and whether it's cement, or lumpy or powdered chemicals, it will move freely and continuously.

Air-operated, the Cleveland Type LSRR Vibrator is low in air consumption as well as cost, and requires minimum maintenance. Made of steel for rugged service, mounting brackets are wedge-type, fitting easily into the female bracket attached to the car. Female brackets are also obtainable from us for any application where only periodic vibration is required.

Instant starting, with full power is assured.

A catalog illustrating the diversified use of Cleveland Air Vibrators and accessories, on bins, chutes, hoppers, screens, storage tanks, etc., is available by just filling in the coupon, or for more information on your particular problem, just indicate the kind of material you've been 'stuck' with.

THE CLEVELAND VIBRATOR COMPANY
2807 Clinton Ave. • Cleveland 13, Ohio

☐ Please send catalog No. 105.

Name _____ Position _____

Company _____

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City _____ Zone _____ State _____

Our Problem is _____

THE CLEVELAND VIBRATOR COMPANY
2807 Clinton Ave. • Cleveland 13, Ohio

1950 CONCRETE MANUFACTURER'S Machinery and Supply Directory for Producers of Concrete Products, Ready Mixed Concrete

CLASSIFIED DIRECTORY

ASSOCIATIONS, NATIONAL

American Concrete Institute, 18263 W. McNichols Road, Detroit 19, Mich.

American Concrete Pipe Assn., 228 N. LaSalle St., Chicago, Ill.

Autoclave Building Products Assn., c/o Saginaw Brick Co., 4058 Wood St., Saginaw, Mich.

Calcium Chloride Assn., 1028 Connecticut Ave., N. W., Washington, D. C.

Cast Stone Institute, P. O. Box 606, New Haven 3, Conn.

Cinder Concrete Products Assn., P. O. Box 95, Primos, Pa.

Concrete Reinforcing Steel Institute, 38 S. Dearborn St., Chicago, Ill.

National Assn. of Silo Manufacturers, Box 30, Norwich, N. Y.

National Concrete Burial Vault Assn., 2275 Scranton Rd., Cleveland, Ohio.

National Concrete Masonry Assn., 38 S. Dearborn St., Chicago 3, Ill.

National Ready Mixed Concrete Assn., 1328 "E" St. N. W., Washington 4, D. C.

Perlite Institute, 35 W. 53rd St., New York 19, N. Y.

Portland Cement Assn., 33 W. Grand Ave., Chicago 10, Ill.

Pumice Producers Assn., 121 S. Yale, Albuquerque, N. M.

Vermiculite Institute, 208 S. LaSalle St., Chicago, Ill.

ADMIXTURES

American Bitumuls Co., 200 Bush St., San Francisco 4, Calif.

American Fluresit Co., Inc., 4011 Red Bank Rd., Cincinnati 27, Ohio.

Anti-Hydro Waterproofing Co., 265 Badger Ave., Newark 8, N. Y.

Calcium Chloride Assn., 909 Ring Bldg., Washington 6, D. C.

Ceresit Waterproofing Corp., 512 S. Canal St., Chicago 7, Ill.

Colorcrete Industries, Inc., 510 Ottawa Ave., Holland, Mich.

Dewey & Almy Chemical Co., Cambridge 40, Mass.

Dow Chemical Co., Midland, Mich.

W. E. Dunn Mfg. Co., Holland, Mich.

Hercules Powder Co., 946 King St., Delaware Trust Bldg., Wilmington, Del.

Hopper Products, 12 E. 41st St., New York, N. Y.

A. C. Horn Co., 42-46 10th St., Long Island City 1, N. Y.

Hydroso Products, Inc., 3230 University Ave., Madison 5, Wis.

Masonry Concentrates, Inc., Holland, Mich.

Masters Builders Co., 7016 Euclid Ave., Cleveland, Ohio.

Pittsburgh Plate Glass Co., Columbia Chemical Div., 5th Ave. at Belleford, Pittsburgh 13, Penna.

Quigley Co., Inc., 527-5th Ave., New York 17, N. Y.

Reardon Industries, 2837 Stanton Ave., Cincinnati 6, Ohio.

Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J.

Solvay Sales Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

L. Sonneborn Sons, Inc., 38 Lexington Ave., New York 16, N. Y.

Spray-O-Bond Co., 2225 N. Humboldt Ave., Milwaukee 12, Wis.

Stonhard Company, 1306 Spring Garden St., Philadelphia 23, Pa.

Sullivan Company, 212 E. Trigg Ave., Memphis 2, Tenn.

Tamms Industries, Inc., 228 N. LaSalle St., Chicago 1, Ill.

Truscon Laboratories, Inc., 1640 Caniff Ave., Detroit 11, Mich.

Wyandotte Chemicals Corp., Michigan Alkali Div., Wyandotte, Mich.

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Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.

Curtis Pneumatic Machy. Div., Curtis Mfg. Co., 1905 Klenlon Ave., St. Louis 20, Mo.

Davey Compressor Co., Kent, Ohio.

Roy Darden Industries, Inc., Box 95, Northside Sta., Atlanta, Ga.

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Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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Gardner-Denver Co., Quincy, Ill.

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Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis.

Lynch Corp., Par Compressor Division, 3600 Summit St., Toledo, Ohio.

Nordberg Mfg. Co., 3073 S. Chase Ave., Milwaukee, Wis.

Novo Engine Co., 702 Porter St., Lansing, Mich.

O. K. Clutch & Machy. Co., 619 Florence St., Columbia, Pa.

Quincy Compressor Co., 217 Main St., Quincy, Ill.

Schramm, Inc., Virginia Ave., West Chester, Penna.

Gordon Smith & Co., 481 College Ave., Bowling Green, Ky.

Stearns Mfg. Co., Adrian, Mich.

Westinghouse Electric & Mfg. Co., First Natl. Bank Bldg., Pittsburgh, Pa.

Western Machy. Co., 760 Folsom St., San Francisco, Calif.

Wittemann Machy. Co., Farmingdale, N. J.

Worthington Pump & Machy. Corp., Harrison, N. J.

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Atlantic Chemicals, Inc., P. O. Box 3466, Orlando, Fla.

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Carter-Waters Corp., 2440 Penway, Kansas City, Mo.

Dewey & Almy Chemical Co., Cambridge 40, Mass.

Hercules Powder Co., 946 King St., Delaware Trust Bldg. Wilmington, Delaware.

A. C. Horn Co., 42-46 10th St., Long Island City 1, N. Y.

Hydroso Products, Inc., 3230 University Ave., Madison 5, Wis.

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Reardon Industries, 2837 Stanton Ave., Cincinnati 5, Ohio.

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Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J.

Solvay Sales Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, New York.

Spray-O-Bond Co., 2225 N. Humboldt St., Milwaukee 12, Wis.

Sullivan Company, 212 E. Trigg Ave., Memphis 2, Tenn.

Charles R. Watts & Co., 4121-6th N. W., Seattle 7, Wash.

E. W. Zimmerman, 228 N. LaSalle St., Chicago, Ill.

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Beaumont-Birch Co., 1505 Race St., Philadelphia, Penna.

Besser Mfg. Co., Alpena, Mich.

Blaw-Knox, Div. of Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 30, Pa.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Bonded Scale Co., 41 Bellview Ave., Columbus 7, Ohio.

Buffalo Scale Co., Buffalo, N. Y.

Butler Bin Co., Waukesha, Wis.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Construction Machinery Co., P. O. Box 358, Waterloo, Iowa.

The F. D. Cummer & Son Co., 900 Keith Bldg., Cleveland, Ohio.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Iowa Mfg. Co., 916-16th St., N. E., Cedar Rapids, Iowa.

Jackson & Church Co., 321 N. Hamilton St., Saginaw, Mich.

The Jeffrey Mfg. Co., Columbus 16, Ohio.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Link Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.

Madsen Iron Works, 5631 Bickett, Huntington Park, Calif.

Multiplex Machinery Corp., Elmore, Ohio.

Noble Company, 1860-7th St., Oakland 20, Calif.

Richardson Scale Co., Van Houten Ave., Clifton, N. J.

Scientific Concrete Service Corp., 724 Salem Ave., Elizabeth 3, N. J.

Smith Machine Sales Co., 505-5th Ave., New York, N. Y.

T. L. Smith Co., 2885 N. 32nd St., Milwaukee 10, Wis.

Sprout, Waldron & Co., Inc., Muncy, Pa.

Stearns Mfg. Co. Inc., Adrian, Mich.

Stephens-Adamson Mfg. Co., 7 Ridgeway Ave., Aurora, Ill.

Supremix, Inc., Adrian, Mich.

Syntron Co., Homer City, Pa.

Willard Concrete Machy. Co., Ltd., 2906 Imperial Highway, Lynwood, Calif.

Winslow Gov't Std. Scale Works, Inc., Terre Haute 1, Ind.

Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Penna.

The Yoder Co., 5500 Walworth, Cleveland 4, Ohio.

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Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Butler Bin Co., Waukesha, Wis.

Chain Belt Co., 1600 Bruce St., Milwaukee, Wis.

Construction Machy. Co., P. O. Box 358, Waterloo, Ia.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles, Calif.

Dodson Mfg. Co. Inc., 1463 Barwise, Wichita 2, Kansas.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 8, Mo.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Hercules Steel Products Corp., Sherman St., Galion, Ohio.

Iowa Mfg. Co., Cedar Rapids, Iowa.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.

Madsen Iron Works, 5631 Bickett St., Huntington Park, Calif.

Mixermobile Mfg., 6835 N. E. Halsey St., Portland 16, Ore.

Multiplex Machinery Co., Elmore, Ohio.

Noble Company, 1860-7th St., Oakland 20, Calif.

Scripps-Pearson Machine Works, P. O. Box 684, Edmonds, Wash.

Stephens-Adamson Mfg. Co., 7 Ridgeway Ave., Aurora, Ill.

Supremix, Inc., Adrian, Mich.

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Victor Balata & Textile Belting Co., 53 Park Place, New York 17, N. Y.

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Boston Woven Hose & Rubber Co., Box 1071, Boston 3, Mass.

Carlyle Rubber Co., 64 Park Place, New York 7, N. Y.

Cincinnati Rubber Mfg. Co., Norwood, Cincinnati 12, Ohio.

Continental Gin Co., Industrial Div., P. O. Box 2614, Birmingham, Ala.

Dayton Rubber Mfg. Co., 4th St. & Jefferson, Dayton, Ohio.

R. & J. Dick Co. Inc., P. O. Box 388, Passaic, N. J.

The Gates Rubber Co., 999 S. Broadway, Denver 17, Colorado.

L. H. Gilmer Co., Tacony, Philadelphia 35, Pa.

Goodall Rubber Co., 5 S. 36th St., Philadelphia, Penna.

B. F. Goodrich Rubber Co., Akron, Ohio.

Goodyear Tire & Rubber Co. Inc., Akron, Ohio.

Hamilton Rubber Corp., Empire State Bldg., New York, N. Y.

Hewitt Rubber Div. of Hewitt-Robins, Inc., 240 Kensington Ave., Buffalo 5, N. Y.

Frank A. Kremser & Sons, Inc., 3435 W. 5th St., Philadelphia 40, Pa.

Main Belting Co., 1241 Carpenter St., Philadelphia 47, Penna.

Manhattan Rubber Co., Div. of Raybestos-Manhattan, Inc., 3 Townsend St., Passaic, N. J.

Manheim Mfg. & Belting Co., Manheim, Pa.

Mercer Rubber Co., 136 Meyer St., Hamilton Sq., N. J.

New York Rubber Corp., 100 Park Ave., New York 17, N. Y.

Pioneer Rubber Mills, 353 Sacramento St., San Francisco 11, Calif.

Quaker Rubber Corp., Comly & Milnor Sts., Philadelphia, Penna.

Republic Rubber Co., Youngstown, Ohio.

Teuscher Pulley & Belting Co., 801 N. 2nd St., St. Louis 2, Mo.

Thermoid Co., Whitehead Rd., Trenton 6, N. J.

United States Rubber Co., 1230-6th Ave., New York 20, N. Y.

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The Baldwin Locomotive Works, Philadelphia 42, Pa.

Beaumont-Birch Co., 1505 Race St., Philadelphia, Pa.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis.

Geo. E. Christopher & Son Iron Works, 1220 Blaine, Wichita 1, Kans.

Construction Machy. Co., P. O. Box 358, Waterloo, Ia.

Quinn Wire & Iron Works, E. 12th St., Boone, Iowa.

Joseph T. Ryerson & Son, 2558 W. 16th St., Chicago, Ill.

San Angelo Foundry & Machine Co., 1000 E. Upton St., San Angelo, Texas.

Sherman Concrete Pipe Machinery, Inc., P. O. Box 3034, Knoxville, Tenn.

Wallace Supplies Mfg. Co., 1302-4 Diversey Parkway, Chicago 14, Ill.

CLASSIFIED DIRECTORY

BIN GATES

The Allen-Sherman-Hoff Co., 1435 Locust St., Philadelphia 2, Pa.

Alpha Tank & Sheet Metal Mfg. Co., 5007 S. 38th St., St. Louis 16, Mo.

American Manganese Steel Div., American Brake Shoe Co., 377 E. 14th St., Chicago Heights, Ill.

Beaumont-Birch Co., 1505 Race St., Philadelphia, Penna.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Brady Conveyors Corp., 20-A W. Jackson Blvd., Great Northern Bldg., Chicago, Ill.

Butler Bin Co., Waukesha, Wis.

Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis.

Geo. E. Christopher & Son Iron Works, 1220 Blaine, Wichita 1, Kans.

Construction Machy. Co., P. O. Box 358, Waterloo, Ia.

Continental Gin Co., Industrial Division, P. O. Box 2614, Birmingham 2, Ala.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Denver Equipment Co., P. O. Box 5268, Denver 17, Colo.

The J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kans.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Fuller Company, Fuller Bldg., Catasauqua, Penna.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

Greenville Mfg. Works, Greenville, Ohio.

Groch Engineering Co., Searchlight, Nevada.

Gruendler Crusher & Pulverizer Co., 2915-17th N. Market St., St. Louis, Mo.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Robt. Holmes & Bros. Inc., 512-522 Junction Ave., Danville, Ill.

Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa.

The Jeffrey Mfg. Co., 935-99 N. 4th St., Columbus 16, Ohio.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun Mfg. & Engr. Corp., 2 Park Ave., New York 16, N. Y.

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Madsen Iron Works, 5631 Bickett St., Huntington Park, Calif.

Manganese Steel Forge Co., Richmond St. & Castor Ave., Philadelphia 34, Pa.

E. F. Marsh Engineering Co., 4030 Chateau Ave., St. Louis 10, Mo.

McLanahan & Stone Corp., 200 Wall St., Hollidaysburg, Pa.

Meyer Scales & Equipment Corp., 449 Central Ave., Orange, N. J.

The Mine & Smelter Supply Co., P. O. Box 5270, Terminal Sta., Denver 17, Colo.

Muller Machinery Co. Inc., Metuchen, New Jersey.

The Neff & Fry Co., Camden, Ohio.

Noble Company, 1860-7th St., Oakland 20, Calif.

Pioneer Engineering Wks., Inc., 1515 Central Ave., N. E., Minneapolis 13, Minn.

Posey Iron Works, Inc., Brick Machinery Division, Lancaster, Pa.

Richardson Scale Co., Van Houten Ave., Clifton, N. J.

Robins Conveyors, Div. Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J.

Rogers Iron Works Co., 11th & Pearl Sts., Joplin, Mo.

Smith Engineering Works, 504 E. Capitol Drive, Milwaukee 12, Wis.

Sprout, Waldron & Co., Inc., Muncy, Pa.

The Standard Metal Mfg. Co., Malinta, Ohio.

Stearns Mfg. Co., Inc., Adrian, Mich.

Stephens-Adamson Mfg. Co., Aurora, Ill.

Straub Mfg. Co. Inc., 507 Chestnut St., Oakland 7, Calif.

Supremix, Inc., Adrian, Mich.

Traylor Engineering & Mfg. Co., 10th & Mill Sts., Allentown, Pa.

Universal Engineering Corp., 625 C Ave., N. W., Cedar Rapids, Ia.

Universal Road Machinery Co., Kingston, New York.

Vulcan Iron Works, 700 S. Main St., Wilkes Barre, Pa.

Webster Mfg. Inc., Tiffin, Ohio.

Willard Concrete Machy. Co., Ltd., 2906 Imperial Highway, Lynwood, Calif.

Wisconsin Foundry & Machine Co., 623 E. Main St., Madison 1, Wis.

BIN LEVEL CONTROLS

Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.

The Bin-Dicator Co., 13946 Kercheval Ave., Detroit 15, Mich.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Brown Instrument Co., 4444 Wayne Ave., Philadelphia 44, Pa.

Butler Bin Co., Waukesha, Wis.

Fairbanks Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

Fuller Company, Fuller Bldg., Catasauqua, Penna.

General Electric Co., 1 River Rd., Schenectady 5, N. Y.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Holly Pneumatic Systems, Inc., 15 E. 40th St., New York, N. Y.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun Mfg. & Engineering Corp., 2 Park Ave., New York 16, N. Y.

Noble Company, 1860-7th St., Oakland 20, Calif.

F. L. Smidth & Co., 11 W. 42nd St., New York 17, N. Y.

Stephens-Adamson Mfg. Co., Aurora, Ill.

BIN LEVEL INDICATORS

The Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.

The Bin-Dicator Co., 13946 Kercheval Ave., Detroit 15, Mich.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Butler Bin Co., Waukesha, Wis.

Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.

The Conveyor Co. Inc., 3260 E. Slauson Ave., Los Angeles 11, Calif.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fuller Company, Fuller Bldg., Catasauqua, Penna.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Holly Pneumatic Systems, Inc., 15 E. 40th St., New York, N. Y.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun Mfg. & Engineering Corp., 2 Park Ave., New York 16, N. Y.

The Jeffrey Mfg. Co., 935-99 N. 4th St., Columbus 16, Ohio.

Mosher Electronic Controls, 130 W. 42nd St., New York 18, New York.

Noble Company, 1860-7th St., Oakland 20, Calif.

F. L. Smidth & Co., 11 W. 42nd St., New York 17, N. Y.

Stephens-Adamson Mfg. Co., 7 Ridgeway Ave., Aurora, Ill.

Syntron Company, Homer City, Penna.

BIN VALVES

Beaumont-Birch Co., 1505 Race St., Philadelphia, Penna.

Blaw-Knox Co., Farmer Bank Bldg., Pittsburgh 22, Pa.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Brady Conveyors Corp., 20-A W. Jackson Blvd., Great Northern Bldg., Chicago, Ill.

Butler Bin Co., Waukesha, Wis.

Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.

Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland, Ohio.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fuller Company, Fuller Bldg., Catasauqua, Penna.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Robt. Holmes & Bros. Inc., 510-522 Junction Ave., Danville, Ill.

The Jeffrey Mfg. Co., 935-99 N. 4th St., Columbus 16, Ohio.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun & Engr. Corp., 2 Park Ave., New York 16, N. Y.

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Noble Co., 1960-7th St., Oakland 7, Calif.

The W. W. Sly Mfg. Co., 4700 Train Ave., Cleveland 2, Ohio.

Stephens-Adamson Mfg. Co., 7 Ridgeway Ave., Aurora, Ill.

Sprout, Waldron & Co. Inc., Muncy, Pa.

Webster Mfg. Inc., Tiffin, Ohio.

CLASSIFIED DIRECTORY

BINS & BATCHING EQUIPMENT

Alpha Tank & Sheet Metal Mfg. Co., 5007 S. 39th St., St. Louis 16, Mo.

Austin-Western Co., 601 Farnsworth Ave., Aurora, Ill.

Besser Mfg. Co., Alpena, Mich.

Bethlehem Steel Co., 701 E. 3rd St., Bethlehem, Penna.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Bonded Scale Co., 41 Bellview, Columbus 7, Ohio.

Butler Bin Co., Waukesha, Wis.

L. Burmeister Co., 4535 W. Mitchell St., Milwaukee 14, Wis.

Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.

Concrete Forms Corp., 49 Conant St., Irvington, N. Y.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

Construction Machy. Co., P. O. Box 358, Waterloo, Iowa.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Dodson Mfg. Co. Inc., 1463 Barwise, Wichita, Kan.

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

The J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kan.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

Greenville Mfg. Works, Greenville, Ohio.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Robt. Holmes & Bros. Inc., 512-522 Junction Ave., Danville, Ill.

Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa.

The Jeffrey Mfg. Co., 935 N. 4th St., Columbus 16, Ohio.

C. S. Johnson, P. O. Box 71, Champaign, Ill.

Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, Ohio.

Kron Div. of Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.

Madsen Iron Works, 5631 Bickett St., Huntington Park, Calif.

Marietta Concrete Corp., Marietta, Ohio.

McDermott Bros. Co., Washington St., Allentown, Penna.

Meyer Scales & Equipment Corp., 449 Central Ave., Orange, N. J.

Multiplex Machinery Corp., Elmore, Ohio.

The Neff & Fry Co., Camden, Ohio.

The Nicholson Co., 10 Rockefeller Plaza, New York 20, N. Y.

Noble Company, 1860-7th St., Oakland 20, Calif.

Posey Iron Works, Inc., Brick Machinery Division, Lancaster, Pa.

Richardson Scale Co., Van Houten Ave., Clifton, N. J.

Sakrete Inc., Fischer Ave. & B. & O. RR., St. Bernard, Cincinnati, Ohio.

Scientific Concrete Service Corp., 724 Salem Ave., Elizabeth, N. J.

Scripps-Pearson Machine Works, P. O. Box 684, Edmonds, Wash.

Simplicity System Co., Riverside Dr., Chattanooga 6, Tenn.

Stephens-Adamson Mfg. Co., Aurora, Ill.

Supremix, Inc., Adrian, Mich.

Universal Engineering Corp., 625 C Ave., N. W., Cedar Rapids, Iowa.

Willard Concrete Machy. Co. Ltd., 2906 Imperial Highway, Lynwood, Calif.

Wisconsin Foundry & Machine Co., 623 E. Main St., Madison 1, Wis.

Wittemann Machy. Co., Farmingdale, N. J.

BLADES, MASONRY SAW

Champion Mfg. Co., 2028 Washington, St. Louis 3, Mo.

Clipper Mfg. Co., 2801 Warrwick, Kansas City, Mo.

Lee Sales Co., 10439 San Carlos, South Gate, Calif.

Stone Machy. Inc., 1714 N. Salina St., Syracuse, N. Y.

Victor Engineering Corp., Green Lane & Wilson Ave., Bristol, Penna.

BLOCK AND BRICK MACHINES

Allied Welding & Mfg. Co., 49 Lorna Doone Blvd., Orlando, Fla.

Anchor Concrete Machinery Co., 1191 Fairview Ave., Columbus 8, Ohio.

J. W. Appley & Son Inc., 831 9th St., N., St. Petersburg 2, Fla.

Brickcrete Associates, Inc., 4651 S. Division Ave., Grand Rapids, Mich.

Brickmaster, Inc., 420 Lexington Avenue, New York 17, N. Y.

Besser Mfg. Co., 106-36th St., Alpena, Mich.

Geo. E. Christopher & Son Iron Works, 1220 Blaine, Wichita 1, Kan.

Columbia Machine Works, 105 Main St., Vancouver, Wash.

Concrete Pipe Machy. Co., 9th & Division St., Sioux City, Iowa.

Crawford Industries, 1100 East Second St., Pomona, Calif.

Concrete Equipment Co., 530 Ottawa Ave., Holland, Mich.

Roy Darden Industries, Inc., Box 95, Northside Sta., Atlanta, Ga.

Des Plaines Concrete Prod. Machy. Co., 930 North Ave., Des Plaines, Ill.

Domine Automatic Machine Co., 155-225 Gould St., Rochester, N. Y.

W. E. Dunn Mfg. Co., Holland, Mich.

Economy Mfg. Co., Stone Mountain, Ga.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

F. C. George Machine Co., 100 S. Westmoreland Dr., Orlando, Fla.

General Engines Co., Drexel Bldg., Philadelphia 6, Penna.

Hydro-Forged Stone Associates, Inc., 434 Bulkley Bldg., Cleveland, Ohio.

Jackson & Church Co., 321 N. Hamilton St., Saginaw, Mich.

The Kent Machine Co., Cuyahoga Falls, Ohio.

Lifetime Building Specialties, Inc., 519 Brook Haven Dr., Orlando, Fla.

Lith-I-Bar Co., Holland, Mich.

Magic-Concrete Eqpt. Co., 18 Woodland Ave., Winsted, Conn.

Masonry Equipment & Engineering Co., 315 E. Michigan Ave., Three Rivers, Mich.

Miles Manufacturing Co., Jackson, Mich.

Leslie C. Miller Supply Inc., Bedford, Ohio.

Mishco Corporation, 615 S. W. 2nd Ave., Miami, Fla.

Mortarless Tile Machine Co., 2623 Riverside Drive, Los Angeles, Calif.

Multiplex Machinery Corp., Elmore, Ohio.

D. J. Murray Mfg. Co., Wausau, Wis.

Norris Self-O-Line Block Co., 4 S. 15th St., Philadelphia, Pa.

Gene Olsen Corp., 401 Grace St., Adrian, Mich.

Oswalt Engineering Service Corp. (Engineering Service), 1335 Circle Ave., Forest Park, Ill.

Posey Iron Works, Inc., Brick Machinery Division, Lancaster, Pa.

Praschak Machine Co., Marshfield, Wis.

Scripps-Pearson Machy. Wks., P. O. Box 684, Edmonds, Wash.

Smith Machine Sales Co., 505-5th Ave., New York, New York.

Stearns Mfg. Co. Inc., Adrian, Mich.

Superior-Liderwood-Mundy Corp., Superior, Wis.

H. R. Sutter Co., 661 Wyoming Ave., Buffalo 15, N. Y.

Syntro-Pac Company, Inc., 1716 East Bessemer Ave., Greensboro, North Carolina.

Twinplex Hydraulics, Inc., 2507 James St., Syracuse 6, N. Y.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

Universal Tampers, Inc., 1530 N. Adams St., Peoria, Ill.

Van Ornum Co., 344 Haddon Ave., Westmont, N. J.

Vibra-Tamp Mach. Co., 803 McCormick St., Greensboro, N. C.

Wittemann Machinery Co., Farmingdale, N. J.

C. M. Wooten Co., 2717 N. Central Ave., Knoxville 17, Tenn.

BOILERS

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.

Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee, Wis.

Combustion Engineering-Superheater, Inc., 1321 N. Branch St., Chicago 22, Illinois.

Cyclotherm Corp., 157 E. 157th St., Oswego, New York.

The Dorr Co., 570 Lexington Ave., New York 22, N. Y.

Kewanee Boiler Corp., Kewanee, Ill.

Kennedy-Van Saun & Engr. Corp., 2 Park Ave., New York 16, N. Y.

McDermott Bros. Co., Washington St., Allentown, Pa.

Manitowoc Engrg. Wks., Manitowoc, Wis.

Straub Mfg. Co., 507 Chestnut, Oakland 7, Calif.

The Wickes Boiler Co., 515 W. Washington Ave., Saginaw, Mich.

William Bros. Boiler & Mfg. Co., 1057-10th Ave., S. E., Minneapolis 14, Minn.

BUCKET LOADERS

Austin-Western Co., 601 Farnsworth Ave., Aurora, Ill.

Barber-Greene Co., 631 W. Park Ave., Aurora, Ill.

Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.

Conveyor Engineering & Supplies Corp., Hobart Pl. & D. L. W. R. R., Clifton, N. J.

Eagle Crusher Co., Galion, Ohio.

Elmco Corporation, P. O. Box 300, Salt Lake City 8, Utah.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

George Haiss Mfg. Co. Inc., Div. of Pettibone Mulliken Corp., 381 Canal Place, New York, N. Y.

The Frank G. Hough Co., E. Sunnyside Ave., Libertyville, Ill.

Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.

The Jeffrey Mfg. Co., 938-99 N. 4th St., Columbus 16, Ohio.

Lessmann Mfg. Co., P. O. Box 873, Des Moines 4, Iowa.

Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.

Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.

Lull Mfg. Co., 3612 E. 44th St., Minneapolis 6, Minn.

N. P. Nelson Iron Wks., Inc., 320 Bloomfield Ave., Clifton, N. J.

Ottawa Steel Products, Inc., 1st & Walnut, Ottawa, Kan.

Pettibone-Mulliken Corp., 4710 W. Division St., Chicago 51, Ill.

Triangle Engineering Co., 2848 W. 26th St., Chicago 23, Ill.

Trowbridge Conveyor Co., 850 Van Houten Ave., Clifton, N. J.

Truk-Loader Co., 45 Grace St., Tiffin, Ohio.

Western Machy. Co., 760-766 Folsom St., San Francisco 7, Calif.

Willard Concrete Machy. Co. Ltd., 2906 Imperial Highway, Lynwood, Calif.

BUCKETS, CONCRETE

Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland 10, Ohio.

Blaw-Knox, Div. of Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 30, Pa.

Construction Machy. Co., P. O. Box 358, Waterloo, Iowa.

Conveyor Engineering & Supplies Corp., Hobart Pl. & D. L. W. R. R., Clifton, N. J.

Dravo Corporation, Neville Island, Pittsburgh, Penna.

Gar-Bro Mfg. Co., 2416 E. 15th St., Los Angeles 21, Calif.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

C. S. Johnson, P. O. Box 71, Champaign, Ill.

Muller Machinery Co. Inc., Metuchen, New Jersey.

Noble Company, 1860-7th St., Oakland 20, Calif.

Superior-Lidgerwood-Mundy Corp., Superior, Wis.

BUCKETS, ELEVATOR

Alpha Tank & Sheet Metal Mfg. Co., 5007 S. 38th St., St. Louis 16, Mo.

Austin-Western Co., 601 Farnsworth Ave., Aurora, Ill.

Beaumont-Birch Co., 1505 Race St., Philadelphia, Penna.

Barber-Greene Co., 631 W. Park Ave., Aurora, Ill.

Baughman Mfg. Co., Jerseyville, Ill.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Chain Belt Co., 1600 Bruce St., Milwaukee, Wis.

Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32, Ill.

The Columbus Conveyor Co., 869 W. Goodale St., Columbus, Ohio.

Continental Gin Co., Industrial Division, P. O. Box 2614, Birmingham 2, Ala.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Conveyor Engineering & Supplies Corp., Hobart Pl. & D. L. W. R. R., Clifton, N. J.

Coyle & Roth, 3024 S. E. 4th St., Minneapolis 14, Minn.

Roy Darden Industries, Inc., Box 95, Northside Sta., Atlanta, Ga.

Denver Equipment Co., 1400-17th St., Denver, Colo.

Diamond Iron Works, Inc., 1728 N. 2nd St., Minneapolis 11, Minn.

Eagle Crusher Co., Galion, Ohio.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

J. B. Ehrsam & Sons Co., Enterprise, Kansas.

The Elmco Corp., P. O. Box 300, Salt Lake City 8, Utah.

Fleming Mfg. Co., Inc., 4985 Fyler Ave., St. Louis 9, Mo.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

Greenville Mfg. Works, Greenville, Ohio.

Gruendler Crusher & Pulverizer Co., 2915-17 N. Market St., St. Louis, Mo.

George Haiss Mfg. Co., Div. of Pettibone Mulliken Corp., Park Ave. & 143rd St., New York 51, N. Y.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa.

Jeffrey Mfg. Co., Columbus 16, Ohio.

C. S. Johnson, P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun & Engr. Corp., 2 Park Ave., New York 16, N. Y.

Kent Machine Co., Cuyahoga Falls, Ohio.

Frank A. Kremser & Sons, Inc., 3435 W. 5th Street, Philadelphia 40, Pa.

Link-Belt Co., 300 W. Pershing Road, Chicago 1, Ill.

Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.

McLanahan & Stone Corp., 200 Wall St., Hollidaysburg, Pa.

Mosher Electronic Controls, 130 W. 42nd St., New York 18, New York.

National Malleable & Steel Castings Co., 10600 Quincy Ave., Cleveland, Ohio.

N. P. Nelson Iron Works, Inc., 320 Bloomfield Ave., Clifton, N. Y.

Noble Company, 1860-7th St., Oakland 20, Calif.

Northern Conveyor Co., Janesville, Wis.

Pettibone-Mulliken Corp., 4710 W. Division St., Chicago 51, Ill.

Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.

Praschak Machine Co., Marshfield, Wis.

Ransome Machy. Corp., 42 Thomas St., Dunellen, N. J.

Robins Conveyors, Div. Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

Rogers Iron Works Co., 10th & Pearl Sts., Joplin, Mo.

Smith Engineering Works, 532 E. Capitol Dr., Milwaukee 12, Wis.

Sprout, Waldron & Co. Inc., Muncy, Pa.

Standard Metal Mfg. Co., Malinta, Ohio.

Stephens-Adamson Mfg. Co., Aurora, Ill.

Sturtevant Mill Co., Harrison St., Boston 22, Mass.

Supremix, Inc., Adrian, Mich.

Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Traylor Engineering & Mfg. Co., 10th & Mill St., Allentown, Pa.

Triangle Engineering, 2948 W. 26th St., Chicago, Ill.

Trowbridge Conveyor Co., 850 Van Houten Ave., Clifton, N. J.

Universal Engineering Corp., 625 "C" Ave., N. W., Cedar Rapids, Iowa.

Universal Road Machinery Co., Kingston, New York.

Webster Mfg. Inc., Tiffin, Ohio.

Western Machinery Co., 760 Folsom St., San Francisco, Calif.

Wisconsin Foundry & Machine Co., 623 E. Main St., Madison 1, Wis.

Witteman Machinery Co., Farmingdale, N. J.

BUGGIES, CONCRETE

Construction Machinery Co., Box 358, Waterloo, Iowa.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kwik-Mix Co., Port Washington, Wis.

Ransome Machy. Corp., 42 Thomas St., Dunnellen, N. J.

Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles 39, Calif.

Worthington Pump & Machy. Corp., Harrison, N. J.

BULK CEMENT HANDLING EQUIPMENT

Atlas Conveyor Co., Box 59-B, Clintonville, Wis.

The C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland 5, Ohio.

Beaumont-Birch Co., 1505 Race St., Philadelphia, Penna.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Penna.

Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco 24, Calif.

Bonded Scale Co., 2166 S. 3rd St., Columbus, Ohio.

Brady Conveyors Corp., 20-A W. Jackson Blvd., Great Northern Bldg., Chicago, Ill.

Butler Bin Co., Waukesha, Wis.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

Continental Gin Co., Industrial Division, P. O. Box 2614, Birmingham 5, Ala.

The Conveyor Co., 2260 E. Slauson Ave., Los Angeles 58, Calif.

Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles, Calif.

Dravo Corporation, Neville Island, Pittsburgh, Penna.

The J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kan.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fleming Mfg. Co., Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Fuller Company, Fuller Bldg., Catasauqua, Penna.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

General Conveyor & Mfg. Co., 3601 Salena St., St. Louis 18, Mo.

Hardinge Co., Inc., 240 Arch St., York, Penna.

Hardy Scale Corp., 5701 Atlantic Blvd., Los Angeles, Calif.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Holly Pneumatic Systems, Inc., 15 E. 40th St., New York, N. Y.

The Frank G. Hough Co., E. Sunnyside Ave., Libertyville, Ill.

Howe Scale Co., 3-13 Scale Ave., Rutland, Vt.

Jeffrey Mfg. Co., 925-99 N. 4th St., Columbus 16, Ohio.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun & Engr. Corp., 2 Park Ave., New York 16, N. Y.

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Lippmann Engineering Works, 4603 W. Mitchell, Milwaukee 14, Wis.

Madsen Iron Works, 5631 Bickett St., Huntington Park, Calif.

Market Forge Co., Materials Handling Div., 77 Gravey St., Everett 49, Mass.

Meyer Scales & Equipment Corp., 449 Central Ave., Orange, N. J.

Noble Company, 1860—7th St., Oakland 20, Calif.

Pioneer Engineering Wks, Inc., 1515 Central Ave., N. E., Minneapolis 13, Minn.

Richardson Scale Co., Van Houten Ave., Clifton, N. J.

Robins Conveyors Div., Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J.

Robinson Air Activated Conveyor Systems, Div. of Morse Boulger Co., 211-G East 42nd St., New York 17, N. Y.

Silent Hoist & Crane Co., Inc., 841-65 63rd St., Brooklyn 20, N. Y.

Sprout, Waldron & Co., Inc., Muncy, Pa.

Stephens-Adamson Mfg. Co., Aurora, Ill.

Supremix, Inc., Adrian, Mich.

Syntron Co., 385 Carson, Homer City, Pa.

Trowbridge Conveyor Co., 850 Van Houten Ave., Clifton, N. J.

Webster Mfg., Inc., Tiffin, Ohio.

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Binghamton Metal Forms, Inc., 15-21 Griswold St., Binghamton, N. Y.

Concrete Forms Corp., 49 Conant St., Irvington, N. Y.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Price Bros. Co., Box 825, Dayton, Ohio.

Quinn Wire & Iron Works, East 12th St., Boone, Iowa.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

FORMS, ORNAMENTAL CONCRETE

Automatic Spring Coiling Co., 4045 W. Thorndale Ave., Chicago 30, Ill.

Chase Concrete Machinery, 15 Linwood Ave., Buffalo 2, N. Y.

Colorcrete Industries, Inc., 510 Ottawa Ave., Holland, Mich.

Concrete Machinery Co., P. O. Box 2248, Hickory, N. C.

W. E. Dunn Mfg. Co., Holland, Mich.

General Engines Co., Drexel Bldg., Philadelphia 6, Penna.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

FORMS, PIPE

Colorcrete Industries, Inc., 510 Ottawa Ave., Holland, Mich.

Concrete Forms Corp., 49 Conant St., Irvington, N. Y.

Concrete Machinery Co., P. O. Box 2248, Hickory, N. C.

Concrete Pipe Machinery Co., 9th & Division Sts., Sioux City 9, Iowa.

W. E. Dunn Mfg. Co., 452 W. 24th St., Holland, Michigan.

Eckel Engineering Co., 192 South 1st St., San Jose, Calif.

Houston Concrete Machy. Co., 6600 Washington Ave., Houston, Texas.

Martin Iron Works, P. O. Box 2257, Terminal Annex, Los Angeles, Calif.

Price Bros. Co., Box 825, Dayton, Ohio.

Quinn Wire & Iron Works, E. 12th St., Boone, Iowa.

Sherman Concrete Pipe Machinery, Inc., P. O. Box 3034, Knoxville, Tenn.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

Universal Concrete Pipe Co., 297 S. High St., Columbus, Ohio.

William Bros. Boiler & Mfg. Co., 1057 10th Ave., S. E., Minneapolis 14, Minn.

Zeidler Concrete Prod. Machy. Co., Newell & Mobile Sts., Waterloo, Iowa.

CLASSIFIED DIRECTORY

FORMS, REUSABLE DUCT

Ductube Company, 940 Shoreham Bldg., Washington 5, D. C.

FORMS, SEPTIC TANK

Ashland Vault, Inc., 500-518 Virginia Ave., Ashland, Ohio.

Berg Vault Co., 1620 Lucas Hunt Rd., St. Louis, Mo.

Carpenter Mfg. Co., R. F. D. No. 1, Box 470, Richmond, Va.

Chase Concrete Machinery, 15 Linwood Ave., Buffalo 2, N. Y.

Concrete Forms Corp., 49 Conant St., Irvington, N. Y.

Greenville Mfg. Works, Greenville, Ohio.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Houston Concrete Machy. Co., 6600 Washington Ave., Houston, Texas.

Norwalk Vault Co., Woodlawn Ave., Norwalk, Ohio.

Quinn Wire & Iron Co., E. 12th St., Boone, Iowa.

Symons Clamp & Mfg. Co., 4249 Diversey Ave., Chicago 39, Ill.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 15, Ill.

FORMS, SPLASH BLOCK

Homeward Steps Co., 3420 W. 9th St., Des Moines, Iowa.

FORMS, STEP

Chase Concrete Machinery, 15 Linwood Ave., Buffalo 2, N. Y.

Concrete Forms Corp., 49 Conant St., Irvington, N. Y.

Homeward Steps Co., 3420 W. 4th St., Des Moines, Iowa.

Kirk & Blum Mfg. Co., 2807 Spring Grove Ave., Cincinnati 25, Ohio.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

FORMS, WELL CURBING

Concrete Forms Corp., 49 Conant St., Irvington, N. Y.

Kirk & Blum Mfg. Co., 2807 Spring Grove Ave., Cincinnati 25, Ohio.

Quinn Wire & Iron Works, E. 12th St., Boone, Iowa.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

GLOVES, WORK

Edmont Mfg. Co., 532 Orange St., Coshocton, Ohio.

General Scientific Equipment Co., 27th & Huntington Sts., Philadelphia 32, Penna.

GUNS, COLOR SPRAY

Chase Concrete Machinery, 15 Linwood Ave., Buffalo 2, N. Y.

Colorcrete Industries, Inc., 510 Ottawa Ave., Holland, Mich.

Curtis Pneumatic Machy., Div. of Curtis Mfg. Co., 1905 Klenlen Ave., St. Louis 20, Mo.

The DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio.

W. E. Dunn Mfg. Co., Holland, Mich.

Spray Engineering Co., 114 Central St., Somerville 45, Mass.

Spray-O-Bond Co., 2225 N. Humboldt Ave., Milwaukee, Wis.

GUN, GROUT AND CAULKING

Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25, Penna.

A. C. Horn Co., 43-46 10th St., Long Island City 1, N. Y.

Ransome Machy. Co., Dunellen, N. J.

Tamms Industries, Inc., 228 N. LaSalle St., Chicago 1, Ill.

HARDENING AGENTS

American Fluresit Co., Inc., 4011 Red Bank Rd., Cincinnati 27, Ohio.

Anti-Hydro Waterproofing Co., 265 Badger Ave., Newark 8, N. Y.

Atlantic Chemicals, Inc., P. O. Box 3466, Orlando, Fla.

Ceresit Waterproofing Corp., 512 S. Canal St., Chicago 7, Ill.

Curtis Pneumatic Machy., Div. of Curtis Mfg. Co., 1905 Klenlen Ave., St. Louis 20, Mo.

Dow Chemical Co., Midland, Michigan.

E. I. DuPont De Nemours & Co., Nemours Bldg., Wilmington 98, Del.

Harshaw Chemical Co., Cleveland, Ohio.

Haynes Products Co., 4007 Farnum St., Omaha 3, Nebr.

A. C. Horn Co., 43-46 10th St., Long Island City 1, N. Y.

Master Builders Co., 7016 Euclid Ave., Cleveland, Ohio.

Reardon Industries, Inc., 2837 Stanton Ave., Cincinnati 6, Ohio.

Solvay Sales Div. Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.

Spray-O-Bond Co., 2225 N. Humboldt Ave., Milwaukee 12, Wis.

Stonhard Company, 1306 Spring Garden St., Philadelphia 23, Pa.

Sullivan Company, 212 E. Trigg Ave., Memphis 2, Tenn.

Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J.

Truscon Laboratories, Inc., 1640 Caniff Ave., Detroit 11, Mich.

Wyandotte Chemicals Corp., Michigan Alkali Div., Wyandotte, Mich.

HEATERS, CONCRETE MIXER

Aeroil Burner Co., Inc., 13th St. & Park Ave., West New York, N. J.

Hauck Mfg. Co., 126 10th St., Brooklyn 15, N. Y.

Littleford Bros., Inc., 460 E. Pearl St., Cincinnati, Ohio.

HOISTING EQUIPMENT, CONCRETE

Curtis Pneumatic Machy. Div. of Curtis Mfg. Co., 1905 Klenlen Ave., St. Louis 20, Mo.

Dodson Mfg. Co., Inc., 1463 Barwise, Wichita 2, Kans.

Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14, Ohio.

F. C. George Machine Co., 100 S. Westmoreland Dr., Orlando, Fla.

Jaeger Machine Co., 520 Dublin Ave., Columbus 11, Ohio.

Kwik-Mix Co., Port Washington, Wis.

Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis.

Marvel Equipment Co., 224 S. Michigan Ave., Chicago 4, Ill.

Meyer Scales & Equipment Corp., 449 Central Ave., Orange, N. J.

Mixermobile Mfrs., 6855 N. E. Halsey St., Portland 16, Oregon.

Muller Machinery Co., Inc., Metuchen, N. J.

Superior-Lidgerwood-Mundy Corp., Superior, Wis.

Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 15, Penna.

HOPPERS

Alpha Tank & Sheet Metal Mfg. Co., 5007 S. 38th St., St. Louis 16, Mo.

Austin-Western Co., 601 Farnsworth Ave., Aurora, Ill.

Barber-Greene Co., 631 W. Park Ave., Aurora, Ill.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Bethlehem Steel Co., 701 E. 3rd St., Bethlehem, Penna.

Butler Bin Company, Waukesha, Wis.

Concrete Transport Mixer Co., 650 Rosedale Ave., St. Louis 12, Mo.

The J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kans.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles 21, Calif.

General Engines Co., Drexel Bldg., Philadelphia 6, Penna.

George Haiss Mfg. Co., Inc., Div. of Pettibone Mulliken Corp., 391 Canal Pl., New York 51, N. Y.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

Robt. Holmes & Bros., Inc., 512-522 Junction Ave., Danville, Ill.

Iowa Mfg. Co., N. E., Cedar Rapids, Iowa.

Jaeger Machine Co., 550 West Spring St., Columbus 16, Ohio

Jeffrey Mfg. Co., 935-99 N. 4th St., Columbus 16, Ohio.

C. S. Johnson Co., P. O. Box 71, Champaign, Ill.

Kennedy-Van Saun Engr. Corp., 2 Park Ave., New York 16, N. Y.

The Kirk & Blum Mfg. Co., 3807 Spring Grove Ave., Cincinnati 25, Ohio.

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis.

Manitowoc Engrg. Wks., Manitowoc, Wis.

Meyer Scales & Equipment Corp., 449 Central Ave., Orange, N. J.

Mortarless Tile Machine Co., 2623 Riverside Drive, Los Angeles, Calif.

New Haven Vibrator Co., 160 Chestnut St., New Haven 7, Conn.

Parsons Engineering Corp., 2546 E. 79th St., Cleveland 4, Ohio.

Robins Conveyors, Div. Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J.

Stephens-Adamson Mfg. Co., Aurora, Ill.

Webster Mfg., Inc., Tiffin, Ohio.

HOSE

American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.

Boston Woven Hose & Rubber Co., Box 1071, Boston 3, Mass.

Carlyle Rubber Co., 64 Park Place, New York 7, N. Y.

Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y.

The Cincinnati Rubber Mfg. Co., Franklin Ave., Cincinnati 12, Ohio.

Continental Rubber Co., 1999 Liberty Blvd., Erie, Pa.

Dayton Rubber Mfg. Co., 4th St. & Jefferson, Dayton, Ohio.

The DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio.

The Elmco Corp., P. O. Box 300, Salt Lake City 8, Utah.

The Gates Rubber Co., 999 S. Broadway, Denver 17, Colo.

Gardner-Denver Co., Quincy, Ill.

B. F. Goodrich Rubber Co., Akron, Ohio.

Goodyear Tire & Rubber Co., Akron, Ohio.

Hewitt Rubber Div. Hewitt-Robins, Inc., 240 Kensington Ave., Buffalo 5, N. Y.

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Manhattan Rubber Mfg. Co., Div. of Raybestos-Manhattan, Inc., 3 Townsend St., Passaic, N. J.

Quaker Rubber Corp., Comly & Milnor Sts., Philadelphia, Pa.

Republic Rubber Div.; Lee Rubber & Tire Corp., Albert St., Youngstown 1, Ohio.

Schramm, Inc., Virginia Ave., West Chester, Penna.

Thermoid Rubber Co., Box 1041, Trenton, N. J.

U. S. Rubber Co., 1230—6th Ave., New York 20, N. Y.

Worthington Pump & Machy. Corp., Worthington Ave., Harrison, N. J.

JOIST AND SLAB MACHINES

Besser Mfg. Co., Alpena, Mich.

Roy Darden Industries, Inc. Box 95, Northside Sta., Atlanta, Ga.

W. E. Dunn Mfg. Co., Holland, Mich.

Greenville Mfg. Works, Greenville, Ohio

Jackson & Church Co., 321 N. Hamilton St., Saginaw, Mich.

The Kirk & Blum Mfg. Co., 2807 Spring Grove Ave., Cincinnati 25, Ohio.

The Lith-I-Bar Co., Holland Evening Sentinental Bldg., Holland, Mich.

Multiplex Concrete Machy. Co., Elmore, Ohio.

KILNS, CONCRETE CURING

Hardinge Co. Inc., 240 Arch St., York, Penna.

Jackson & Church, 321 N. Hamilton St., Saginaw, Mich.

F. L. Smidth & Co., 11 W. 42nd St., New York 18, N. Y.

LIFT TRUCKS

The Atlas Car & Mfg. Co., 1100 Ivanhoe Rd., Cleveland 10, Ohio.

Automatic Transportation Co., 101 W. 87th St., Chicago, Ill.

Baker Industrial Truck Div. of The Baker-Raulang Co., 2168 W. 25th St., Cleveland 13, Ohio.

Barrett-Cravens Co., 3255 W. 30th St., Chicago 23, Ill.

Buda Company, Harvey, Ill.

Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.

Easton Car & Construction Co., Easton, Penna.

Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14, Ohio.

Erickson Power Lift Trucks, Inc., 1401 Marshall St., N. E., Minneapolis 13, Minn.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Gerunger Carrier Co., Dallas, Ore.

Henneuse Engrg. Co., 400 Monroe St., Marion, Ohio.

The Frank G. Hough Co., E. Sunnyside Ave., Libertyville, Ill.

Hyster Company, 2926 N. E. Clackamas St., Portland 8, Ore.

Kwik-Mix Co., Port Washington, Wis.

Lewis-Shepard Sales Corp., 158 Walnut St., Watertown, Mass.

Lift Trucks Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio.

Market Forge Co., Materials Handling Div., 77 Gravey St., Everett 49, Mass.

Milwaukee Power Equipment Co., 525 N. 22nd St., Milwaukee 3, Wis.

Mixermobile Mfrs., 6855 N. E. Halsey St., Portland 16, Ore.

Praschak Machine Co., Marshfield, Wis.

Powers Equipment Mfg. Co., 512 Monroe St., Anoka, Minn.

Ross Carrier Co., 250 Miller St., Benton Harbor, Mich.

Schmidgall Mfg. Co., Fork Division, 307 Cass St., Peoria, Ill.

Service Castor & Truck Corp., 110 S. Superior St., Albion, Mich.

Silent Hoist & Crane Co. Inc., 841-65 63rd St., Brooklyn 20, N. Y.

Stearns Mfg. Co., Adrian, Mich.

Towmotor Corp., 1226 E. 142nd St., Cleveland 10, Ohio.

Transitier Truck Co., 2477 N. W. 23rd Ave., Portland 10, Ore.

Truckman Div., The Knickerbocker Co., 571 Liberty Ave., Jackson, Mich.

West Bend Equipment Corp., West Bend, Wis.

Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 15, Penna.

LINTEL MACHINES

Kent Machine Co., Cuyahoga Falls, Ohio.

Kirk & Blum Mfg. Co., 2838 Spring Grove Ave., Cincinnati 25, Ohio.

Smith Machine Sales Co., 505 5th Ave., New York, N. Y.

METERS, WATER

The Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.

Builders-Providence Inc., 9 Codding St., Providence 1, R. I.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

General Electric Co., 1 River Rd., Schenectady 5, N. Y.

Mishco Corporation, 615 S. W. 2nd Ave., Miami, Fla.

Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.

Spangler Valve Div., Aircraft Fueling Co. Inc., 1535 E. 16th St., Los Angeles 21, Calif.

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Penna.

Worthington Pump & Machy. Corp., Harrison & Worthington Aves., Harrison, N. J.

METERS, SAND MOISTURE

Rainhart Company, 602-8 W. 34th St., Austin 21, Tex.

Scientific Concrete Service Corp., 724 Salem Ave., Elizabeth, N. J.

Spangler Valve Div., Aircraft Fueling Co. Inc., 1535 E. 16th St., Los Angeles 21, Calif.

Valley Ready Mix Concrete Co., Harlingen, Tex.

MIXERS, CONCRETE (BATCH)

Allied Welding & Mfg. Co., 49 Lorna Doone Blvd., Orlando, Fla.

Bergen Machine & Tool Co. Inc., 189 Franklin Ave., Nutley 10, N. J.

Besser Manufacturing Co., Alpena, Mich.

Brickcrete Associates Inc., 4651 S. Division Ave., Grand Rapids, Mich.

Chain Belt Co., 1600 Bruce St., Milwaukee, Wis.

Chase Concrete Machinery, 15 Linwood Ave., Buffalo 2, N. Y.

Colorcrete Industries, Inc., 510 Ottawa Ave., Holland, Mich.

Columbia Machine Works, 105 Main St., Vancouver, Wash.

Concrete Equipment Co., 530 Ottawa Ave., Holland, Mich.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

George E. Christopher & Son Iron Works, 1220 Blaine, Wichita 1, Kan.

Construction Machy. Co., Glenwood & Vinton Sts., Waterloo, Iowa.

The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif.

Roy Darden Industries, Inc., Box 95, Northside St., Atlanta, Ga.

Denver Equipment Co., 1400 17th St., Denver, Colo.

Dodson Mfg. Co. Inc., 1463 Barwise, Wichita 2, Kans.

W. E. Dunn Mfg. Co., Holland, Mich.

Chas. Gatzke Mfg. Co., 930 North Ave., Des Plaines, Ill.

F. C. George Machine Co., 100 S. Westmoreland Dr., Orlando, Fla.

Gilson Bros. Co., Fredonia, Wis.

Henneuse Engrg. Co., 400 Monroe St., Marion, Ohio.

Jackson & Church Co., 321 N. Hamilton St., Saginaw, Mich.

Jaeger Machine Co., 520 Dublin Ave., Columbus 11, Ohio.

Kent Machine Co., Cuyahoga Falls, Ohio.

Knickerbocker Co., Contractor's Manufacturers Div., Jackson, Mich.

Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis.

Kwik-Mix Co., Port Washington, Wis.

Miles Manufacturing Co., Jackson, Mich.

Lith-I-Bar Co., Holland, Mich.

Mishco Corporation, 615 S. W. 2nd Ave., Miami, Fla.

Mixermobile Co. Inc., 608 S. Hill St., Los Angeles, Calif.

Mortarless Tile Machine Co., 2622 Riverside Dr., Los Angeles, Calif.

Muller Machinery Co. Inc., Metuchen, N. J.

Multiplex Machinery Corp., Elmore, Ohio.

Praschak Machine Co., Marshfield, Wis.

Ransome Machy. Co., 42 Thomas St., Dunellen, N. J.

Scripps-Pearson Machine Works, P. O. Box 684, Edmonds, Wash.

Smith Machine Sales Co., 505 5th Ave., New York, N. Y.

T. L. Smith Co., 2885 N. 32nd St., Milwaukee 10, Wis.

Blystone Division, Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.

Stearns Mfg. Co., Adrian, Mich.

Supremix, Inc., Adrian, Mich.

Universal Concrete Pipe Co., 297 S. High St., Columbus, Ohio.

Universal Tampers, Inc., 1530 N. Adams St., Peoria, Ill.

Willard Concrete Machy. Co., Ltd., 2906 Imperial Highway, Lynwood, Calif.

C. M. Wooten Co., 2716 N. Central, Knoxville, Tenn.

Worthington Pump & Machy. Corp., Harrison & Worthington Aves., Harrison, N. J.

The Yoder Company, 5500 Walworth Ave., Cleveland 2, Ohio.

MIXERS, CONCRETE (CONTINUOUS)

George C. Christopher & Son Iron Works, 1220 Blaine, Wichita 1, Kan.

Des Plaines Concrete Prod. Machy., 930 North Ave., Des Plaines, Ill.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Houston Concrete Machy. Co., 6660 Washington Ave., Houston, Tex.

Kent Machine Co., Cuyahoga Falls, Ohio.

Lifetime Building Specialties Inc., 519 Brook Haven Dr., Orlando, Fla.

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

Leslie C. Miller Supply, Inc., Bedford, Ohio.

Multiplex Machinery Corp., Elmore, Ohio.

Gene Olsen Corp., 401 Grace St., Adrian, Mich.

Posey Iron Works, Inc., Brick Machinery Division, Lancaster, Penna.

Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.

Superior-Lidgerwood-Mundy Corp., 7 Dey St., New York 7, N. Y.

Worthington Pump & Machy. Corp., Harrison & Worthington Aves., Harrison, N. J.

The Yoder Co., 5500 Walworth Ave., Cleveland 2, Ohio.

MIXERS, MORTAR

Chain Belt Co., 1600 Bruce St., Milwaukee, Wis.

Blystone Div., Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.

Geo. E. Christopher & Son Iron Works, 1220 Blaine, Wichita 1, Kan.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

Construction Machy. Co., Glenwood & Vinton, Waterloo, Iowa.

F. C. George Machine Co., 100 S. Westmoreland Dr., Orlando, Fla.

Gilson Bros. Co., Fredonia, Wis.

Jaeger Machine Co., 520 Dublin Ave., Columbus 11, Ohio.

Knickerbocker Co., Contractor's Manufacturers Div., Jackson, Mich.

Kwik-Mix Co., Port Chester, Wis.

Muller Machinery Co. Inc., Metuchen, N. J.

Multiplex Machinery Corp., Elmore, Ohio.

Posey Iron Works, Inc., Brick Machinery Division, Lancaster, Pa.

Ransome Machy. Corp., 42 Thomas St., Dunellen, N. J.

Worthington Pump & Machy. Corp., Harrison & Worthington Aves., Harrison, N. J.

MIXERS, TRUCK

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Chain Belt Co., 1600 Bruce St., Milwaukee, Wis.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

Conserco Co., River Rd. & B. & O. R.R., Washington, D. C.

Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles, Calif.

Jaeger Machine Co., 520 Dublin Ave., Columbus 11, Ohio.

Mixermobile Co. Inc., 608 S. Hill St., Los Angeles, Calif.

Ransome Machy. Co., 42 Thomas St., Dunellen, N. J.

T. L. Smith Co., 2885 N. 32nd St., Milwaukee 10, Wis.

Willard Concrete Machy. Co. Ltd., 2906 Imperial Highway, Lynwood, Calif.

Worthington Pump & Machy. Corp., Harrison & Worthington Aves., Harrison, N. J.

MIXING PLANTS, CENTRAL

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Butler Bin Co., Waukesha, Wis.

Chain Belt Co., 1600 Bruce St., Milwaukee, Wis.

Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

Construction Machy. Co., Glenwood & Vinton Sts., Waterloo, Iowa.

The Conveyor Co., Inc., 2260 E. Slauson Ave., Los Angeles 11, Calif.

Dodson Mfg. Co., 1463 Barwise, Wichita 2, Kans.

Erie Steel Const. Co., 67 Geist Rd., Erie, Penna.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

Heltzel Steel Form & Iron Co., 1750 Thomas Rd., Warren, Ohio.

C. S. Johnson, P. O. Box 71, Champaign, Ill.

Mixermobile Co., Inc., 608 S. Hill St., Los Angeles, Calif.

Noble Co., 1360 7th St., Oakland 7, Calif.

Ransome Machy. Corp., 42 Thomas St., Dunellen, N. J.

T. L. Smith Co., 2885 N. 32nd St., Milwaukee 10, Wis.

Stephens-Adamson Mfg. Co., 7 Ridgeway Ave., Aurora, Ill.

Sturtevant Mill Co., Harrison St., Boston 22, Mass.

Supremix, Inc., Adrian, Mich.

Worthington Pump & Machy. Corp., Harrison & Worthington Aves., Harrison, N. J.

OFFBEARERS

Bergen Machine & Tool Co. Inc., 189 Franklin Ave., Nutley 10, N. J.

Besser Mfg. Co., Alpena, Mich.

Columbia Machine Works, 105 Main St., Vancouver, Wash.

F. C. George Machine Co. Inc., 100 S. Westmoreland Dr., Orlando, Fla.

The Kent Machine Co., 1931 Thomas St., Cuyahoga Falls, Ohio.

Mishco Corporation, 615 S. W. 2nd Ave., Miami, Fla.

Multiplex Machinery Corp., Elmore, Ohio.

Gene Olsen Corp., 401 Grace St., Adrian, Mich.

Smith Machine Sales Co., 505 5th Ave., New York, N. Y.

Stearns Mfg. Co. Inc., Adrian, Mich.

Van Ornum Co., 244 Haddon Ave., Westmont, N. J.

PAINTS AND COATINGS, CONCRETE

American Fluresit Co. Inc., 4011 Red Bank Rd., Cincinnati 27, Ohio.

American Bitumuls Co., 200 Bush St., San Francisco 4, Calif.

Anti-Hydro Waterproofing Co., 265 Badger Ave., Newark 3, N. Y.

Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25, Penna.

Carter-Waters Corp., 2440 Penway, Kansas City, Mo.

Ceresit Waterproofing Corp., 512 S. Canal St., Chicago 7, Ill.

Colorcrete Industries, Inc., 510 Ottawa Ave., Holland, Mich.

W. E. Dunn Mfg. Co., Holland, Mich.

E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

A. C. Horn Co., 43-46 10th St., Long Island City 1, N. Y.

Hydroxo Waterproofing Prod., 3230 University Ave., Madison 5, Wis.

Kay-Tite Co., West Orange, N. J.

Masonry Concentrates, Inc., Holland, Mich.

Master Builders Co., 7016 Euclid Ave., Cleveland, Ohio.

Material Chemical & Mfg. Co., 3617 S. May St., Chicago 9, Ill.

Reardon Industries Inc., 2837 Stanton Ave., Cincinnati 6, Ohio.

Sakrete Inc., Fischer Ave. & B. & O. R. R., St. Bernard, Cincinnati, Ohio.

Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J.

L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.

Stonhard Company, 1306 Spring Grove St., Philadelphia 23, Pa.

Sullivan Company, 212 E. Trigg Ave., Memphis 2, Tenn.

Spray-O-Bond Co., 2225 N. Humboldt Ave., Milwaukee 12, Wis.

Tamms Industries, Inc., 228 N. La Salle St., Chicago 1, Ill.

Tremec Company, 3122 Roanoke Rd., Kansas City 8, Mo.

Truscon Laboratories, Inc., 1640 Caniff Ave., Detroit 11, Calif.

United Paint & Varnish Co., 2128 Niagara St., Buffalo, N. Y.

United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

Utility Color Co. 377-99 Frelinghuysen Ave., Newark 5, N. J.

PALLETS, STEEL, WOOD, FOR CONCRETE PRODUCTS

Anchor Concrete Machinery Co., 1191 Fairview Ave., Columbus 8, Ohio.

Besser Mfg. Co., Alpena, Mich.

Chase Concrete Machinery, 15 Linwood Ave., Buffalo 2, N. Y.

Chase Fdry. & Mfg. Co., 2300 Parsons Ave., Columbus 7, Ohio.

Commercial Shearing & Stamping Co., Youngstown, Ohio.

Roy Darden Industries, Inc., Box 95, Northside Sta., Atlanta, Ga.

Fabricators Steel Mfg. Corp., 850 E. 133rd St., New York, N. Y.

Frantz Pattern & Foundry Co., 2201 E. Artesia St., Long Beach 5, Calif.

Fleming Mfg. Co. Inc., 4985 Fyler Ave., St. Louis 9, Mo.

F. C. George Machine Co., 100 Westmoreland Dr., Orlando, Fla.

Helmick Fdry. Machine Co., 101 8th St., Fairmont, W. Va.

Kirk & Blum Mfg. Co., 2507 Spring Grove Ave., Cincinnati 25, Ohio.

Lewis-Shepard Sales Corp., 158 Walnut St., Watertown, Mass.

Lith-I-Bar Co., Holland, Mich.

Market Forge Co., Materials Handling Div., 77 Gravey St., Everett 49, Mass.

Martin Iron Works, P. O. Box 2857, Terminal Annex, Los Angeles, Calif.

Miles Manufacturing Co., Jackson, Mich.

Mortarless Tile Machine Co., 2623 Riverside Dr., Los Angeles, Calif.

Multiplex Machinery Corp., Elmore, Ohio.

Pallet Systems Inc., 120 Guardian Bldg., Cleveland 14, Ohio.

Schmeller Aluminum Foundry Co., 2300 E. 87th St., Cleveland 4, Ohio.

Sherman Concrete Pipe Machinery, Inc., P. O. Box 3034, Knoxville, Tenn.

Southeast Steel Sales Co., 100 W. Amelia St., Orlando, Fla.

Stearns Mfg. Co., Adrian, Mich.

R. K. Tyra Co., P. O. Forest Lake, Tyra, Minn.

PALLET CLEANERS

Bergen Machine & Tool Co., 189 Franklin Ave., Nutley 10, N. J.

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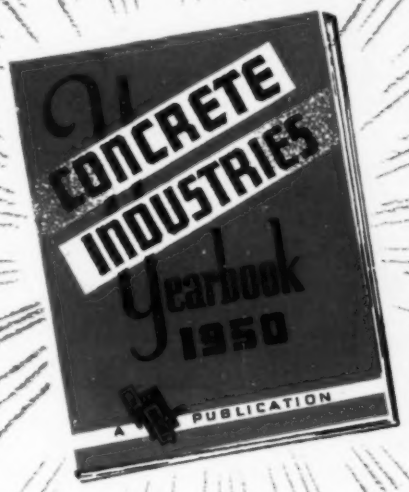

1950 Edition CONCRETE INDUSTRIES YEARBOOK

Largest in its History... incorporating all the latest available information on machinery equipment and processes

Thoroughly Re-edited—Pages of New Information

Because of the rapid growth of the industry in the past few years, and the important technological developments which have accompanied that growth, the Yearbook has been re-edited from front cover to back. Pages of new information, drawn from the experiences of the industry's outstanding producers, have been added to make this edition more than ever the indispensable text book of the concrete field.

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With every producible block, joist and cubic yard of concrete desperately needed today to ease the most severe housing shortage this nation has ever known, you will want more than ever to have on your desk this practical, down-to-earth guide to better production and higher profits.

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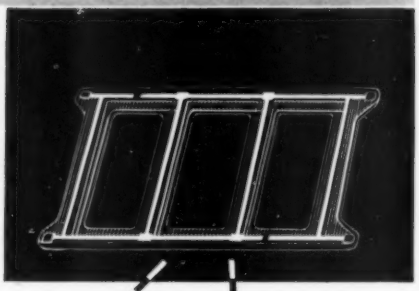
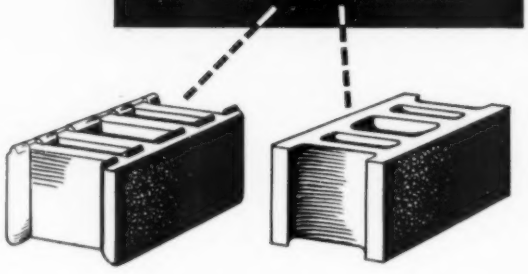
It pays to modernize your plant...

and here's the most modern pallet ➡ yet perfected!





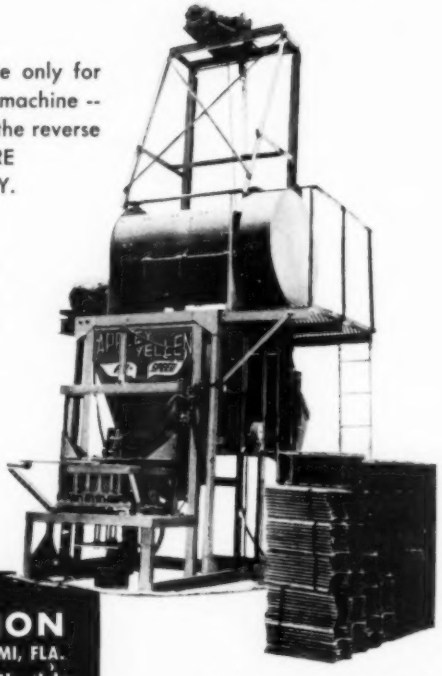
NOW -- with just ONE MACHINE and one set of pallets -- you can compete in TWO SEPARATE and DISTINCT MARKETS! LOW investment cost...HIGH and DIVERSIFIED output! Meet the trend toward MORTARLESS BLOCK!

★ ★ ★

This new Type "R" reversible pallet -- available only for use with the Appley-Yellen Hi-Speed block machine -- produces BOTH a conventional block and, with the reverse side, a Mortarless Interlocking block. ONE CORE BOX ONLY. ONE SET OF PALLETS ONLY.

Truly one of the most important improvements in the concrete industry, the Type "R" reversible pallet* is sold only through Mishco Corp., Miami, Florida, and Mortarless Machine Corp., Los Angeles, California. All concrete plants using this pallet are assigned an exclusive territorial franchise for their area.

WE'LL GLADLY HELP YOU! If you are interested in modernizing YOUR plant at moderate cost, or in building a new plant, to achieve high, diversified output -- just write or wire us. Our consultant will gladly advise you without obligation.



MISHCO CORPORATION
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A MASONRY SAW MUST Have ALL THESE FEATURES for Guaranteed Performance

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Automatic Blade Pressure

Makes your blades last longer... Because Equalizer Spring automatically cushions blade pressure whether cutting HARD or SOFT materials. Outstanding for blade economy.

PATENTED
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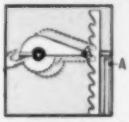


One man easily adjusts Cutting Head to desired height . . . Whether cutting 12" or 1" material. Operator's hands merely guide. All weight is supported by rear Connecting Bar.

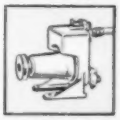
PATENTED
Adjust-A-Cut Control

Merely pull the knob — and the Cutting Head is free for finger-tip setting at any desired angle. Release the Knob — and Head is locked in the desired position.

PATENTED
One-Spot Operation

From ONE SPOT at the front of his Clipper Saw the Operator performs every cutting operation and makes every saw adjustment. Never leaves his operating position.

"Wet or Dry" Pump



No need to remove belt when cutting dry. No maintenance...Factory Sealed...An exclusive Clipper development. Patented Water Application Unit controls water flow.

ONLY Clipper HAS THEM ALL

9 MODELS
Priced from $195

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MASONRY SAWS

Only Clipper guarantees "To provide the fastest cut...At the lowest cost ...With the greatest ease...Any time ...Any where..." because ONLY Clipper has ALL the vital saw features illustrated and described on this page. The most important of these features that make possible instant portability, complete flexibility, and smooth, sensitive cutting performance are exclusively Clipper.

Cut WET or DRY
The 100% ANSWER

The new Model HD Clipper, because it cuts WET and DRY, answers every masonry cutting problem. No need to disconnect the Pump V-Belt in switching from wet to dry cutting. The Clipper "WET OR DRY" Pump cannot be harmed by dry cutting.

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CLIPPER BONDED DIAMOND BLADES

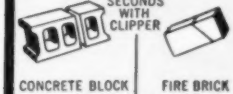
37 separate and distinct Clipper DRY Cutting Abrasive and WET Abrasive Blades—and 19 different types of Clipper Diamond Blades provide you with the absolutely correct blade specifications for any type of cut on every type of material.

SOLD DIRECT FROM FACTORY TO USER ONLY

What the Famous Clipper FREE TRIAL Guarantees You

The famous 13-year old Clipper FREE TRIAL Guarantee still enables the user to prove by actual use the amazing money-making efficiency of a Clipper Saw right on the job—SMALL or LARGE—on any masonry material.

ANY Masonry material regardless of hardness is easily cut in SECONDS WITH CLIPPER



Portability

Two easy-to-handle pieces — the Cutting Head and Saw Frame — are dismantled in seconds and easily moved from one location to another.

Stabilizer Control

Just turn handle to lock Head for fixed diamond blade cutting. A safety lock when transporting saw as a unit.

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Patented Water Application Unit systematically controls water flow.

Ball Bearing Cart

Self-aligning—streamlined—ball bearing Conveyor Cart with Adjustable Stop and Rule for swift accurate measurements.

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Handy accessory clamps material instantly in any desired position for cutting special shapes.

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An outstanding safety feature. Increases Operator comfort by eliminating spray when cutting wet.

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Packed with power, special masonry cutting Motor totally enclosed, dust and water proof.

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The ORIGINAL Masonry Saw

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NATION-WIDE DIRECT FACTORY SERVICE

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CUT WET or CUT DRY
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SAVE MONEY!

with the George "presspac" series 400

Hydraulically Operated Concrete Block Machines

GEORGE
Redi-Furred or Conventional Blocks save 10% on Cement!

400 A
Fully automatic with automatic pallet feed. Includes air hoist. *Saves more money.*

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One-man operation, without automatic pallet feed and automatic attachment. Air hoist optional.

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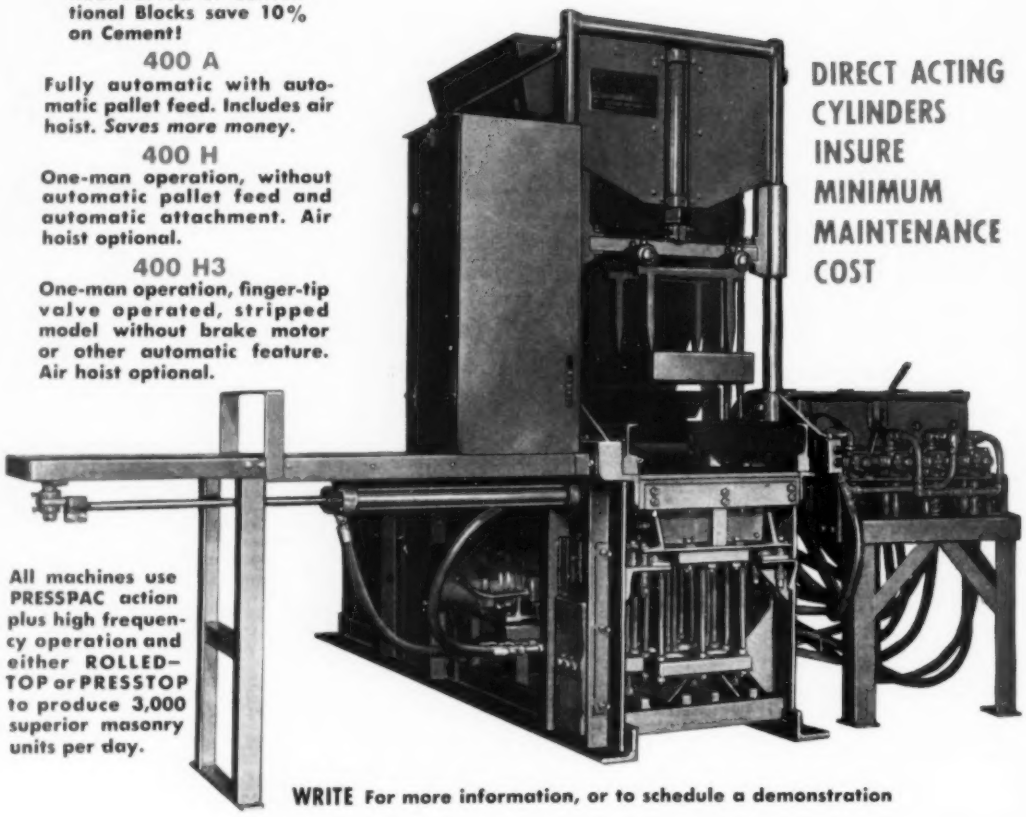
One-man operation, finger-tip valve operated, stripped model without brake motor or other automatic feature. Air hoist optional.



DIRECT ACTING CYLINDERS INSURE MINIMUM MAINTENANCE COST

All machines use PRESSPAC action plus high frequency operation and either ROLLED-TOP or PRESSTOP to produce 3,000 superior masonry units per day.

WRITE For more information, or to schedule a demonstration

GET an appointment with our **SALES ENGINEERS**

"ABSOLUTELY THE FINEST TWO-BLOCK MACHINE ON THE MARKET"

F. C. GEORGE MACHINE CO.
100 SOUTH WESTMORELAND DRIVE • ORLANDO, FLORIDA

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HORN

the air-entraining agent for concrete

COLONIAL SAND & STONE CO.
INCORPORATED

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Mr. A. C. Horn
A. C. Horn Company
43-42 10th Street
Long Island City, N.Y.

Dear Mr. Horn:

Concerning your inquiry, we would like to state that we have been using Ayr Trap on many thousand yards of concrete for about 1 years time. Our experience with this material has been entirely satisfactory.

We have found:

1. Concrete with this mix does not suffer any reduction in strength in the richer mixes and in the leaner mixes show an increase in strength.

2. Same is not sensitive to variations in the type and amount of sand incorporated in the mixes, therefore, we are not called upon to change the amount we add everytime a new sand or a different mix is used.

3. No elaborate equipment is necessary for dispensing same. Ordinary pint measure is used. Variations on the recommended quantities does not seriously affect the results.

4. Adding this material to the mixes simplifies our plant operations in that we do not have to tie up any storage hoppers as would be required with the interground cement. Errors that would result with the variations of cement as required are reduced.

Very truly yours
COLONIAL SAND & STONE CO., INC.
Frank L. Kelly
Vice President

Indispensable for Heavy Concrete Work

Ayr-Trap can be added at batching plants or on the job. It makes concrete more durable, increases its plasticity and minimizes segregation and bleeding. Ayr-Trap improves scaling resistance, chloride salt resistance and protects concrete against its most common failures. Ayr-Trap permits a reduction in the water cement ratio. Used in liquid form as follows: 3 liquid ozs. per cubic yard of 5 or 6 bag mix—1 pint per 5 cubic yds. 6 bag mix.

A. C. HORN COMPANY, INC.
Manufacturers of materials for building maintenance and construction—established in 1897
10th Street & 44th Avenue, Long Island City 1, N. Y.
Los Angeles • San Francisco • Houston • Chicago • Toronto
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GENTLEMEN:

Please send complete data on AYR-TRAP.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

YODER
100-TON
Concrete Testing Machine

"Our Yoder Testing Machine showed us how to maintain quality with more economical mixes, saving from $15.00 to $20.00 per day, or over *$4000.00 per year*"

Report by one Concrete Products Manufacturer

. . . and that's only Part of the Saving!

In addition, figure the present cost of sending samples out for testing—most of which is saved.

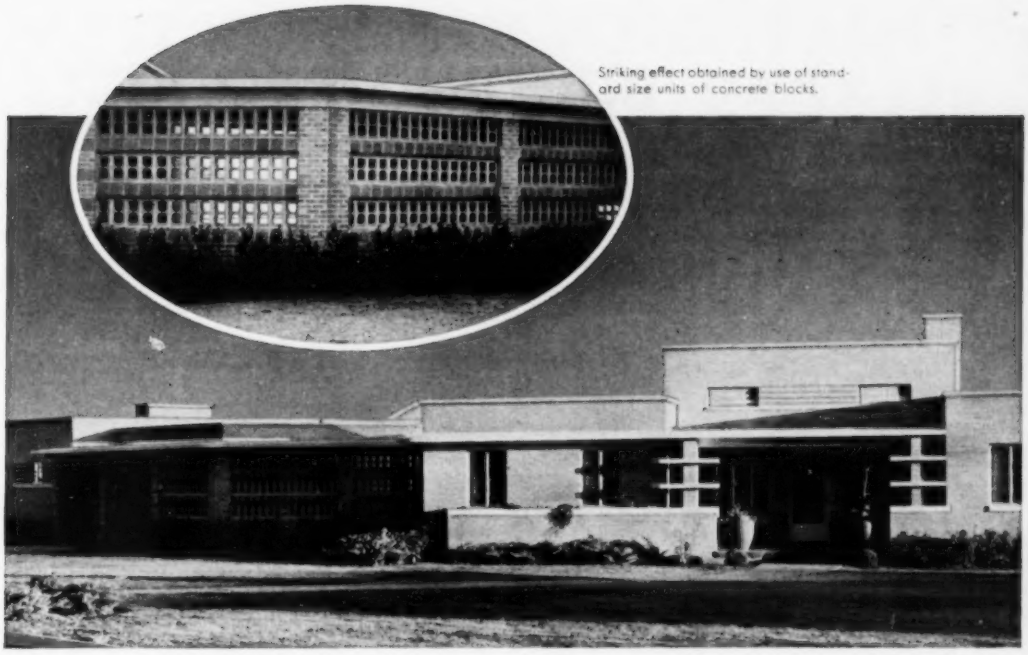
Here's a rugged, accurate machine, so simple anyone can quickly learn how to make his own tests. The price is only $900.00 — the first and virtually the only cost.

This machine enables you to keep an accurate check on daily production and quality. Compression tests tell the story quickly. Equally important, when something does go wrong, fracture examination helps you quickly discover just *what* is wrong. So you save much time in determining whether the trouble is due to faulty aggregate, proportioning, segregation, mixing, molding or curing.

Investigate! Send for illustrated brochure containing useful information on the machine itself as well as the many advantages of testing concrete products in your own plant.

Concrete Machinery Division
THE YODER COMPANY
5550 Walworth Avenue, Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING



Striking effect obtained by use of standard size units of concrete blocks.

Attractive home of Mr. N. D. Harter, Oklahoma City, Okla. Exterior walls, 4" pumice brick backed with 8" pumice block. Partitions, pumice block. All brick and block made with Lehigh Air-Entraining Cement.

ARCHITECT: Rue, Berlowitz and Commander. **GENERAL CONTRACTOR:** Frederickson Constructors, Inc. **MASONRY UNITS:** Harter Marblecrete Stone Company.

NEW IDEAS make SALES for Concrete Masonry Units

New uses for concrete masonry units are constantly being developed. In ordinary construction where other materials are commonly used. In unusual applications, too, such as the interesting breezeway shown here.

When you suggest new ideas, new uses for your products, you step out in front of competition, develop profitable sales others overlook. Such opportunities are all around you, waiting to be picked up by the maker of blocks of top quality and appearance.

Leading block manufacturers tell us that units made with Lehigh Air-Entraining Cement offer many sales advantages . . . many manufacturing economies. They say units are stronger, better looking . . . plant operations run smoother, culls and throwbacks are reduced.

Try Lehigh Air-Entraining Cement with your own aggregate, and note the difference in quality and costs.

LEHIGH CEMENTS

LEHIGH PORTLAND CEMENT COMPANY

ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

LEHIGH PORTLAND CEMENT • LEHIGH EARLY STRENGTH CEMENT • LEHIGH AIR-ENTRAINING CEMENT • LEHIGH MORTAR CEMENT

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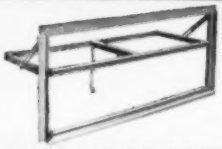
Quality-Built for Quality Building

ALUMINUM BASEMENT AND UTILITY WINDOWS
Latest addition to modern building, combining beauty and long life. No upkeep, no repainting, no rusting. All aluminum construction. Cam latch assures tight fit.

KEWANEE MASTER STEEL BASEMENT WINDOW
The finest basement window on the market. Weather-tight, with exclusive controlled ventilation feature. Vents easily removed. Putty-puttyless glazing. Screens and storm sash available.



STANDARD BASEMENT WINDOW
Tight-fitting window, competitively priced. Putty-puttyless glazing. Screens and storm sash available.

COMMERCIAL STEEL WINDOW
Ideal for garages, shops, smaller commercial and industrial buildings. Vertical mullion bars available for combining in groups. Putty-puttyless glazing. Screens available.

STEEL UTILITY WINDOW
There is an excellent market for this fine window. Widely used in garages, filling stations, and miscellaneous small buildings. Constructed of heavy rolled sections. Putty or puttyless glazing.

LARGE COMMERCIAL STEEL WINDOW
A larger window for commercial or industrial use. Two vents; heavy, hot-rolled sections. Screens available. Mullion bars to combine window in groups.

BASEMENT COAL CHUTE
Made of steel and guaranteed against breakage. Locks securely. Door is tight-fitting. Slotted hinges hold it open during coal delivery.

FORMED STEEL LINTEL
Kewanee Lintels are formed of heavy 10 gauge steel, have ample load-bearing capacity. Edges beveled to provide good masonry bond.

FLUE CLEANOUT DOOR
Convenient, strong, inexpensive. Unbreakable hinges furnished with strap anchors for positive anchorage.

FIREPLACE ASH DUMP
Double-doors for automatic dumping action. Tight-fitting when closed to prevent ash dust from re-entering room. Standard firebrick size.

OTHER KEWANEE BUILDING PRODUCTS
Portable Chutes for Handling Ready Mixed Concrete • Coal Hole Rings and Covers • Bell Trap Cesspools • Cistern Rings and Covers • Cast Iron Ventilation Grates • Sewer Tile Strainers • Brick Carriers • Adjustable Flue Thimbles • Built-In Adjustable Mail Chutes • Window Wells • Standard Industrial Windows.

STEEL MORTAR BOX
Smooth interior — no joints, seams or rivets. Formed from single sheet of rust-resistant steel.

NEW STEEL FLITE BIN-VEYOR
For Retail Coal Deliveries
Steel flight construction permits delivery at higher elevations. Low first cost and low maintenance cost. Weighs only 230 lbs. Write for descriptive folder.

Write for information on our special utility window for use with concrete sill block.

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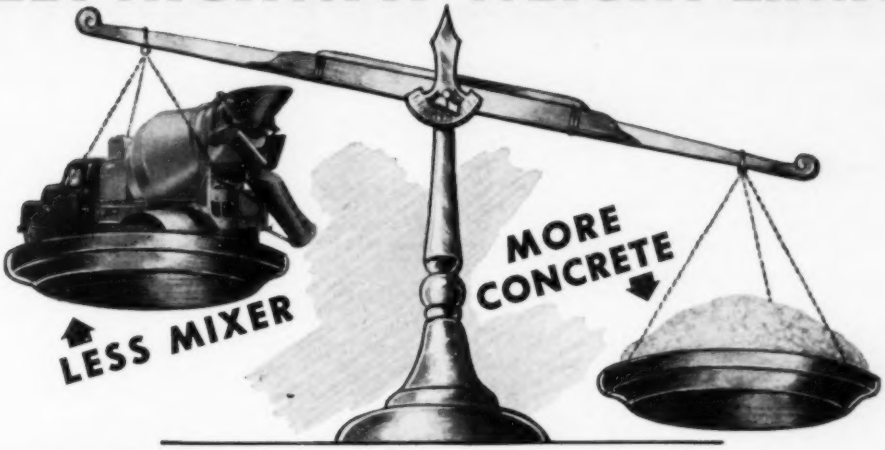
850 Burlington Avenue, Kewanee, Ill.

MEET HIGHWAY WEIGHT LIMITS



SMITH TILTERS

Save More Dollars for Pre-Mix Plants

The cost of a Smith Tilter is saved over and over again in bigger payloads for your agitators and time saved in getting agitators out of the yard. A Smith Tilter shrinks the batch in a hurry and mixes it smoothly, without the usual violent action of other concrete mixers. In discharging the batch, there isn't the slightest segregation. Six sizes available — 1, 2, 3, 4, 5 and 6 yards per batch. Write for bulletins.

BIGGER PAYLOADS in New Smith-Mobile LOADLIMIT TRUCK MIXERS

Have you load limit problems? Then use Smith-Mobile LOADLIMIT Truck Mixers. You get less dead weight. So you can haul more concrete. And you can do it without sacrificing quality. It's all very simple. Certain parts and assemblies not basic or necessary are eliminated. Less mixer? Yes, but the same sturdiness and performance. Enables you to haul BIGGER PAYLOADS at lower cost. The initial cost is less and both operating and maintenance costs reduced to a minimum. LOADLIMIT models are available in 2, 3, 4½ and 5½ yard sizes. Higher ratings for agitators. All carry approved NRMCA rating plates. Get the complete story. Ask for Bulletin No. 247.

The Standard Smith-Mobile, shown here, can easily be converted to a LOADLIMIT model. A LOADLIMIT model can easily be converted to a Standard Smith-Mobile.

THE T. L. SMITH COMPANY
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1900 *Our 50th Anniversary* – A HALF CENTURY OF PROGRESS BUILDING BETTER MIXERS! 1950

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FREE

ALL MAKES OF GOOD USED BLOCK MACHINES GIVEN AWAY TO ANYBODY WHO AGREES TO BUY THE PALLETS THAT COME WITH THE MACHINES.

WE BUY NOTHING OLDER THAN 1946, 1947 and 1948 EQUIPMENT, AND WE PAY TOP PRICES IN CASH FOR GOOD USED EQUIPMENT.

IT MUST BE GOOD OR WE DON'T BUY IT.

"WE GUARANTEE EVERYTHING THAT WE SELL"

CHASE CONCRETE MACHINERY CO.

15 Linwood Avenue—Buffalo 2, N. Y.
— Telephone: Lincoln 0918 —

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FOR SALE

1	3 yd. Jaeger truck mixer (mounted)	$1600.00
1	2 yd. Blaw Knox truck mixer (mounted)	1100.00
1	2 yd. Jaeger truck mixer	700.00
1	1 yd. Rex Truck mixer	350.00
1	3 compartment batch bin with 1 yard batcher	700.00
1	Bonded Roll Crusher 16x16	400.00
2	Bonded Vibrators 3x6—2 deck each	300.00

F. R. Koch Sand and Gravel

PHONE 4063 BOX 337
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AGGREGATE FOR SALE

BURNED RED SHALE FOR CONCRETE BLOCKS OR BRICK, LIGHTWEIGHT, FIREPROOF, PROCESSED READY FOR USE. SHIPPED FROM APPALACHIA, VA. OR LAKE CITY, TENNESSEE.

H. P. DAVID P.O. BOX 342
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All shades and grades the highest quality.
Write for color cards, prices and samples

RICKETSON MINERAL COLOR WORKS
MILWAUKEE 2, WISCONSIN
Established 1885

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BRICK MORTAR STUCCO-PLASTER-CONCRETE

"Fine Because of Their Fineness"
Ask for samples and recommendations.

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HENRY, VIRGINIA

PACKER-HEAD WINGS

Both McCracken Type and Martin Trowelers—PROVED to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
LUFKIN, TEXAS

SAVE 50%

We guarantee savings of ½ and more on all used equipment.

1—#9 JOLTCRETE	$3500.00
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40—STEEL RACKS	$15.00 ea.
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2—Multiplex Chimney Block Machines & Pallets	$150.00 ea.
2—Pallet Dunkers	$55.00 ea.
2—Anchor Tampers	$150.00 ea.
2—Stearns Clipper Stripper	$750.00 ea.

Thousands of Steel and Aluminum Pallets in stock, all sizes. Send tracing for quotation.

GENERAL ENGINES CO., INC.
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WRITE, WIRE, PHONE: Gloucester 6-1337

BLOCK PLANT WANTED

Man with experience in block business and limited capital wants opportunity to take over block plant by lease, by purchase, or on other suitable arrangement. Capable of taking full charge at once.

Box Number E 3,
c/o Concrete Manufacturer
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UNBREAKABLE PALLET RINGS

Write for full information

TEXAS FOUNDRIES
LUFKIN, TEXAS

FORK TRUCK BARGAINS

2—Lewis-Shepard Fork Lift Trucks. Model GFTT. 4000# capacity. 9' lift. Both like new.

1—Hyster QT 20 with front scoop. Used 3 months.

CURTIS M. FIGG Ph. 3140J3 — 1942
210 N. 5th Street Niles, Michigan

FOR SALE

One 4½ yd. Jaeger Hi-Dump Mixer less than 4 year old.
One 5 yd. Jaeger Horizontal Mixer.
One Erickson Fork-Lift truck, 2 years old.
One 32 foot tandem flat-rack trailer.

HUTSONVILLE CONCRETE COMPANY
Hutsonville, Ill. Phone 20

CEMENT COLORS — PROMPT SHIPMENTS

Write for samples and prices of "LANSCO" CEMENT COLORS in bright shades of RED, YELLOW, GREEN, BLUE, BLACK, BROWN. Manufactured by

LANDERS-SEGAL COLOR CO.
76 Delevan Street, Brooklyn 31, N. Y.

FOR SALE

400 Block per hour, Rebuilt like new, GEORGE Hydraulic Pressape and Vibration Block Machines. $3150.00 f.o.b. Orlando, Florida.

Contact Dept. "P", F. C. GEORGE MACHINE CO., 100 S. Westmoreland Drive, Orlando, Florida.

FOR SALE

DUNBRIK BRICK MACHINE, as is or reconditioned. Pallets, racks, mixer and hoist also available.

Box No. E 2, c/o Concrete Manufacturer
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WANT TO BUY

We will purchase for cash two old style Vibrapacs—model using 18½" x 26" pallets. Operating condition not necessary. Wire your offer.

BETHAYRES CONCRETE PRODUCTS CO.
Bethayres, Pennsylvania

PRICED TO SELL

2 CU. YD. CONCRETE TRANSPORT MIXER

In excellent condition, can be inspected at our plant. Reason for selling — stepping up production & increasing size of mixers to 4 cu. yd.

Will also sell power take-off necessary for above mixer.

Make us an offer.

GOLDCAMP SAND & GRAVEL
Phone 2351 Ironton, Ohio

FOR SALE

Complete block plant equipment including 2 clipper strippers complete with mold boxes, pallets for 12", 8", & 4". 1 electric lift, 1 hand lift, Besser 46 cu. ft. mixer, bins, elevator, hopper, racks, motors, oilers, etc.

Block machines used less than 30 months. All this equipment needs is a good home. Will sell as is, where is, for $7500 cash. No less.

To see in operation, contact **AL C. DALE & SON, 136 S. Yale Ave., Columbus, Ohio. Phone RA 2470.**

FOR SALE

One (1) 2 yard Transport transit mixer 1947. Price		$1000.00
One (1) 1½ yard Rex transit mixer. Price		500.00
500 only ¾ x 18 x 18 Steel pallets. Price		450.00

All in good condition

CONCRETE PRODUCTS COMPANY
Wakefield, Michigan

BLOCK MACHINERY BARGAINS

Stearns Model "A" Clipper	$500.00
Multiplex Tamper & Stripper & 1500 CI pallets. Good condition	900.00
Multiplex Chimney Machine & 95 pallets. Very good	275.00
Champion Drain Tile. Used 4 mo.	750.00

CURTIS M. FIGG, WALTON RD., NILES, MICH.

AUTOMATIC AGGREGATE FEEDER FOR CHAMPION DRAIN TILE MACHINE

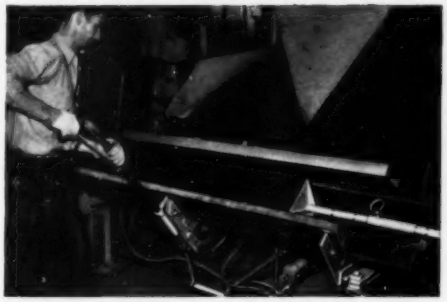
Adaptable for 3" up to 12" tile completely automatic, fully adjusted, save labor. Increase production, will pay for itself in two months.

Write or phone for further information.

MEIER-BUSSE COMPANY
29 West Perry Street
Tiffin, Ohio 3550

SUCCESS DEMANDED A LARGER KENT LINTELATOR

— SO HERE IT IS —



FIVE SIZES NOW AVAILABLE

for Making 4", 6" and 8" LINTELS

No. 6 for LINTELS up to	6'	in length
No. 7 for LINTELS up to	7'4"	in length
No. 8 for LINTELS up to	8'8"	in length
No. 9 for LINTELS up to	9'4"	in length
No. 10 for LINTELS up to	10'8"	in length

(also for SILLS AND FENCE POSTS)

Success with Kent Lintelator machines, wherever used, has brought new buisenss to users with added profits they would not otherwise have enjoyed.

They began to ask for machines to make the largest sizes of lintels so we provided it in our new No. 9 machine, which is not only ideal for making 4", 6" and 8" lintels up to 10'8" in length—but SILLS AND FENCE POSTS ALSO.

Here is the means of getting additional *plus* business and *plus* profits.

If it's profitable for others, it should be equally successful for you. Why don't you get *all the facts* if you haven't already done so, particularly in view of the fact that you will entail no obligation by doing so.

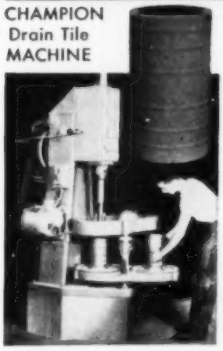
WRITE FOR ILLUSTRATED LITERATURE

The KENT MACHINE CO. Cuyahoga Falls, Ohio

Manufacturers of CONCRETE PRODUCTS MACHINERY *Since 1925*

BIG PROFIT Manufacturing Cement Drain Tile

CHAMPION Drain Tile MACHINE



Farm drainage—home building—reclamation projects—highway construction. From these and other sources comes the biggest demand for drain tile in history. More local plants are urgently needed.

It's a wide-open opportunity. Either as an independent, full-time business or as a profitable addition to other concrete products.

World's Finest Tile

Champion-made drain tile are dense, strong, truly round and always uniform. No distortion, no shaling. Far superior to clay tile—worth more but can be sold for less. And still leave a handsome profit margin.

The Champion makes manufacturing easy. Pares costs. Requires no high-priced labor. Makes all sizes up to 12-inch. Yet calls for only a moderate investment.

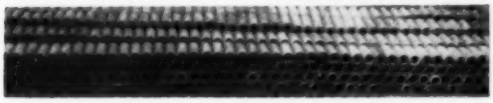
Get the Facts

Write for new Drain Tile Book. Tells about the possibilities in the drain tile business—costs of materials—selling prices—etc. Also completely describes the new Champion machine.

CONCRETE EQUIPMENT CO.

532 Ottawa Avenue

HOLLAND, MICHIGAN

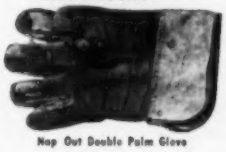


Glove costs cut 65%

Grab-it Coated Glove

CASE NO. 194

Workmen regularly wore out double-palm fabric gloves handling 3000 bricks, laid without mortar in kiln floor. Same men with Grab-it Gloves now handle 15,000 bricks, reducing glove cost from 9c per thousand bricks to 3.2c. All tests showed close 5-to-1 wear ratio. Full details on request.



Nap Out Double Palm Glove

WORN 6 HOURS by Bricklayer's Helper

You can make comparable savings. On all work that requires a firm grip, wet or dry, on sharp cutting or abrasive materials such as concrete block, clay products, sheet metal, lumber, glass or bags, ***Grab-it*** gloves of tough, flexible, rough-surfaced natural rubber, bonded to strong fabric, far outwear heavy canvas or costlier leather—just like a tire.

FREE TEST: Write today, stating your job condition, materials handled and temperature. We supply sample gloves and complete test details to employers, without cost.

MANAGEMENT:
It pays to promote better work gloves. Every dollar saved directly increases your profits — or the net income and good will of workers who buy their own.

Grab-it FIRM GRIP—NO SLIP

Edmont Mfg. Co.

554 Orange St., Coshocton, Ohio

How a Little Simple Arithmetic Will Save You Money!

A little simple addition will save you money on your cinder aggregates. To the first cost of the unprocessed cinders add all the expenses you incur in making them hopper-ready. Add the cost involved in locating a satisfactory deposit, hauling expenses, interest on your processing equipment investment, equipment maintenance, paper work and all incidental expenses involved . . . to find out what your aggregate costs actually are.

Now **compare** the hopper-ready cost of your aggregates with that of our quality prepared aggregates. In most instances it will be discovered you can obtain our quality product for less.

But that's not all! Consider the other important advantages of obtaining aggregates from us. Let's start with quality because it reflects in the ultimate cost and salability of each block. Miller's aggregates are processed from carefully selected cinders that are tested to make sure stain causative agents and combustible materials contents are at a harmless minimum. Processing is thorough—the aggregates are screened, sized and mixed to provide a product that is easy to use and produces uniform, top quality blocks consistently.

CINDERS

Don't overlook the value of a dependable source! Idle equipment and labor make no profits. When you order Miller's cinders you can be sure of a constant supply of hopper-ready aggregates. We have four plants to fill your needs—to keep your plant producing.

Compare the actual cost of your present cinders with that of Miller's hopper-ready aggregates . . . consider the quality . . . consider the value of a dependable source and you will follow the lead of many other successful block manufacturers in ordering quality **prepared** hopper-ready aggregates from Miller's. Contact us today for complete information.

WRITE US NOW — MENTION RAILROAD DELIVERY

H. HESSEY MILLER, Chester, Pa.

BUILD STRONGER WALLS FASTER AT LESS COST
by adding Dur-O-wal. . . . the patented reinforcing that gives a backbone of steel to every masonry wall. Dur-O-wal is custom designed to lay fast in the mortar joint.

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ADD STRENGTH OF STEEL TO EVERY MASONRY WALL

Dur-O-wal is good news for the masonry industry. Easy to handle . . . performance tested . . . Dur-O-wal offers new construction possibilities to structures of block, brick or tile. Electrically welded; packaged for convenient storage. Write . . . wire or phone for additional information. Specifications and sales helps available on request.

Dept. Q, Dur-O-wal Div., Cedar Rapids Block Co., Cedar Rapids, Ia.

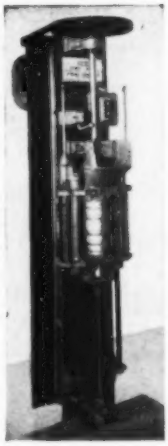
DUR-O-WAL

Patented STEEL Reinforcing FOR MASONRY WALLS

The ACE

An Entirely NEW - Completely DIFFERENT CONCRETE DRAIN TILE MACHINE

EASY TO OPERATE
LOW MAINTENANCE COST
NO GEARS NO CAMS
NO CLUTCH



The ACE is the concrete drain tile machine you have been looking for. Developed after an extensive survey to determine what concrete products men wanted in a drain tile machine, the ACE features a Packer-type combination head and shoes cast in one piece to assure a perfect tile.

GE or Westinghouse 1200 RPM Ball-bearing motor and Stop and Go switch. Finest quality air cylinder, oversize, positive action, precision mounted, heavy-duty construction throughout. Just push the switch, apply the air control valve and the ACE is working for you making a product you'll be proud to sell.

With 2,000 drain tile a day made on the ACE placed on your yard at less than 3½ cents each—now check with the sales price of Concrete Drain Tile in your territory. Then figure your profit—do this today.

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MORE THAN 70 PLANTS OPERATING IN 28 STATES

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The exclusive franchise for your territory may still be open. If you wish to have one of our field representatives contact you, write

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$4300.00! HOW CAN SO LITTLE MONEY BUY SO MUCH! 400 BLOCKS PER HOUR

VAN-U-MATIC BLOCKMAKER

VAN-U-MATIC has ALL the features . . . Pneumatic power operation, vibration and off-bearer . . . Plain pallets (⅓ usual pallet investment) . . . Makes all size blocks, 16″ or 18″ length . . . Quick, easy changeover . . . True dimensional, Perfect blocks . . . Compact, easy to install and clean . . . We can finance.

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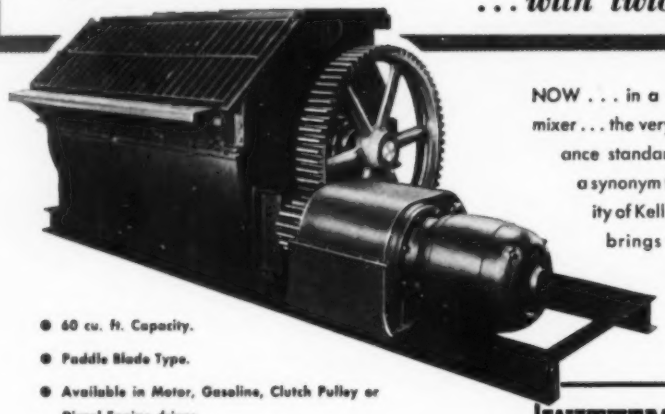
... with twice the capacity!



- 60 cu. ft. Capacity.
- Paddle Blade Type.
- Available in Motor, Gasoline, Clutch Pulley or Diesel Engine drives.
- Also available: 20 cu. ft. and 30 cu. ft. mixers.

Write for full technical information and specifications

NOW . . . in a new, big-production, big capacity mixer . . . the very same high precision and performance standards that have made Kelley mixers a synonym for perfection. With twice the capacity of Kelley's famed "30-D" Mixer, the "60-S" brings you greater efficiency, greater economy, more sustained, faster production. Yet, the over-all height is the same as the "30-D".

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Successors to E. B. Kelley Co.
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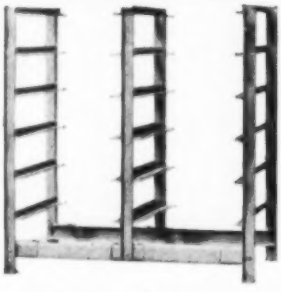
Corrosion-Resistant Hi-Strength Alloy Steel



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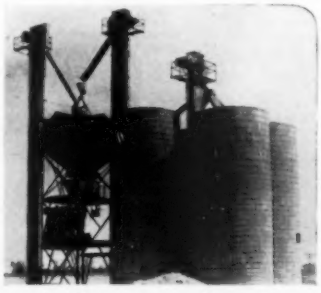

Marietta's engineering department is prepared to assist you by studying the storage needs of your plant or yard. They will make you a layout without charge which will show exactly what you can expect from a Marietta storage system. Bins of either Air-Cell or concrete staves are fully guaranteed to meet your satisfaction.

A long list of enthusiastic owners is the best proof of MARIETTA superiority. Our own crew does the erection work in record time. For full details, write or wire our nearest office.

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HERE ARE THE FACTS
About the Use of
Calcium Chloride
in Concrete

"The Effects of Calcium Chloride on Portland Cement" is a 40-page semi-technical book that tells you the facts about the use of Calcium Chloride in concrete. It describes in detail the carefully controlled tests that have been conducted by recognized authorities in the field and in the laboratory . . . and the results obtained.

Valuable Information For Contractors, Architects, Engineers, Plant Operators

Everybody who works with concrete—directly or indirectly—will be interested in this book. It gives factual answers to such questions as . . .

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- What are the effects on volume change and on surface wear?
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These are just a few of the questions answered in "The Effects of Calcium Chloride on Portland Cement." In addition, there are graphs, tables, charts and much material that is now available for the first time in this book.

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Truck-Man is a light, speedy, highly maneuverable truck that works a shift on little more than a gallon of gas . . . requires minimum maintenance . . . has simple controls any worker quickly learns to operate. The special 62" platform handles even 72 block racks . . . those extra big loads that mean more profit per trip between block machine and curing room. Various platform heights, widths and lengths available to suit your operation.

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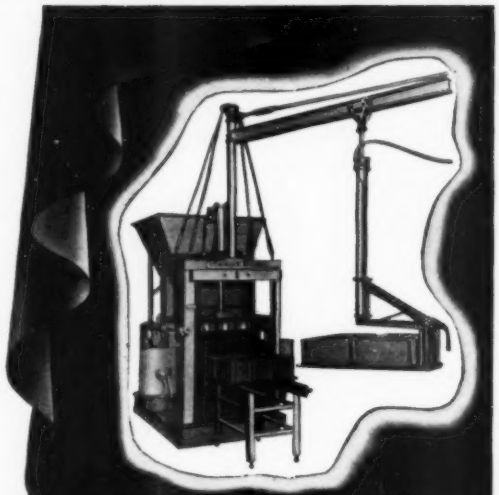

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Dependable — Accurate

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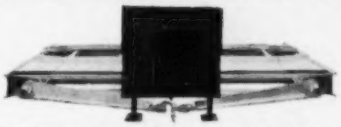

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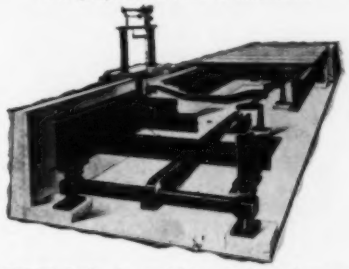

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Write for Full Details

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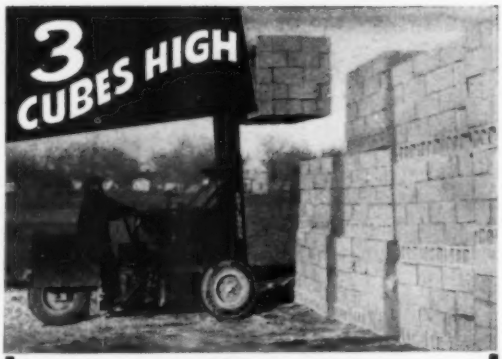

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Doubled Our Yard Capacity—"Four million blocks is a lot for one lift truck to handle in a yard that is anything but level," writes a user. "So we decided we needed another. Then this year we purchased a third Erickson, your high lift tilt style truck. In the short time that we have had it, this truck has more than paid for itself. It has about doubled the capacity of our yard and is a great help in picking up cubes as well as loading trucks."

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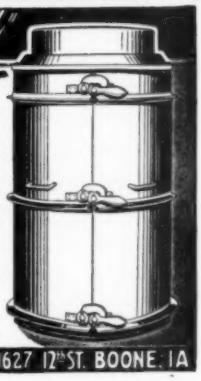

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 25 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

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For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 18" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

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50 TONS of sand, cinders, crushed stone or similar materials **UNLOADED** in a matter of minutes

Bulk materials can't "stick around" in hopper cars and slow down production when you're equipped with NATIONAL Car Shakers!

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The NATIONAL Car Shaker is priced low for real economy. It needs no heavy auxiliary equipment, and is handled by a one ton hoist with jib crane or monorail. Can be set up by one man, and under normal operating conditions requires no one inside the car.

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ORNAMENTAL TABLES

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Here is a natural for extra profits! You can make these and many other beautiful products out of concrete with our low-cost aluminum molds that can be used over and over again and which will last a lifetime with normal care. It will pay you to find out more about this extra source of profit.

We have aluminum molds for a wide variety of styles and sizes —vases, urns, flower pots, bird baths, benches, jars, etc. You'll be amazed at the enormous profits possible.

Write us today!

CONCRETE MACHINERY CO.
P. O. Box 2248 Hickory, North Carolina

Available Soon

THE MULTICO "LITTLE BEAVER"

New High Speed, Low Cost Concrete Block Machine

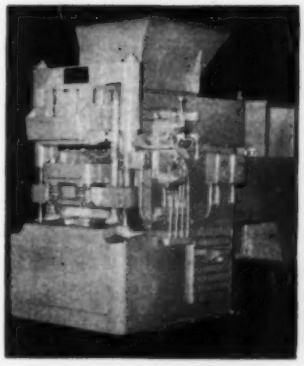
THE MULTIPLEX MACHINERY CORP.
ELMORE, OHIO

YOU'LL MAKE MORE BLOCKS WITH A *Columbia!*

HERE'S WHY

- PLAIN PALLETS
- VIBRATION PLUS COMPRESSION
- 4-6 AND 8 INCH HIGH BLOCKS
- 4 TO 6 PALLETS PER MINUTE
- OIL HYDRAULIC
- ANY TYPE OF AGGREGATE
- AUTOMATIC OR SEMI-AUTOMATIC

● WRITE TODAY FOR COMPLETE INFORMATION!



Columbia MACHINE WORKS
105 MAIN STREET • VANCOUVER, WASHINGTON

You have more salesmen for *CONCRETE MASONRY* than you think

On many construction jobs—whether homes, farm buildings, stores or factories—decisions about building materials are made before plans are drawn. These decisions may come when prospects (1) discuss loans with bankers or savings and loan officials, (2) purchase land from realtors or (3) read building news in local papers.

The men who influence these decisions—bankers, realtors and editors—can serve their customers effectively only when they know all the facts. It will pay you to keep them informed about the many advantages of concrete masonry construction. Furnish local editors with items and pictures of building projects using your block.

Such merchandising stimulates extra sales. Other ways to build business include: (1) making block that complies with ASTM and Federal specifications for moisture content, strength and water absorption, (2) keeping a list of quality concrete masonry buildings in your community from which you can select examples to show prospects and (3) furnishing prospects with names of architects and builders who have established a reputation for designing and building quality concrete masonry structures.

PORTLAND CEMENT ASSOCIATION

33 W. Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete...through scientific research and engineering field work

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*See also detailed information in 1949 Pit and Quarry HANDBOOK and Concrete Industries Yearbook

Reproduction of a page advertisement appearing in Practical Builder, to help Vibrapac-equipped plants sell more block.

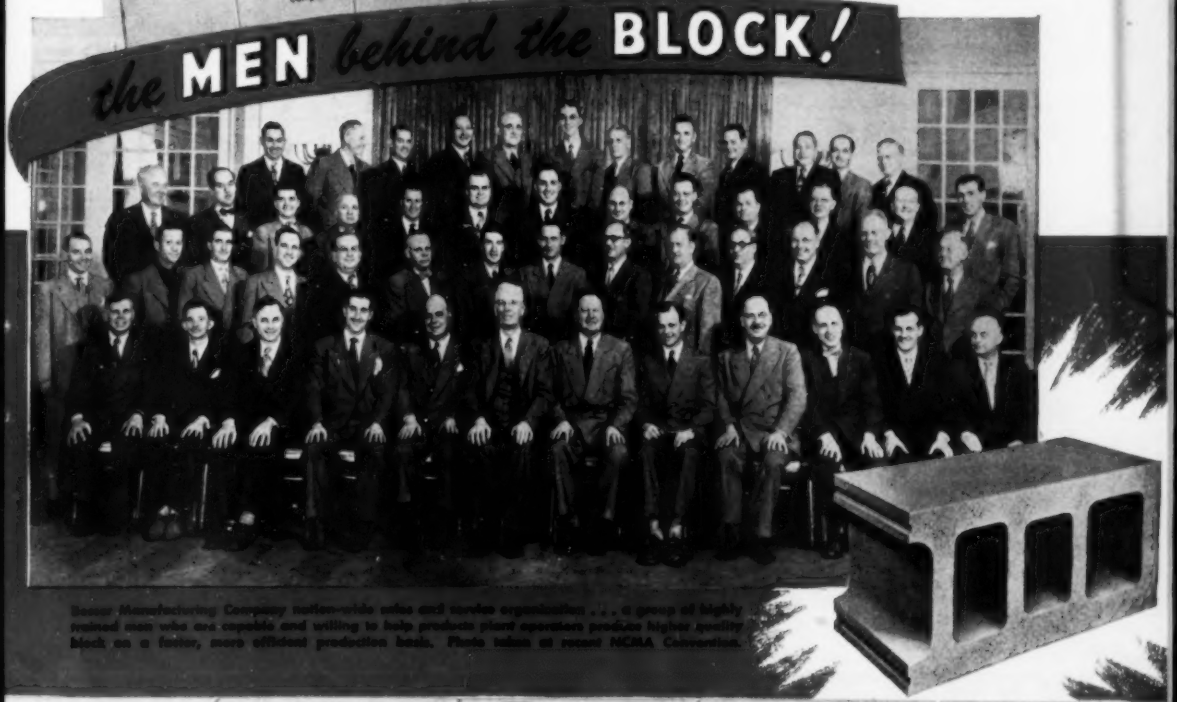
When You Can Place Your Order With

CONFIDENCE!

Architects and Contractors, in ever increasing numbers, are specifying VIBRAPAC Block because it's a low-cost permanent building material with square corners, clean-cut edges and accurate modular dimensions. These builders of fine homes know that VIBRAPAC block grows stronger with age . . . is fire-safe and wind-resistant . . . cool in summer . . . easy to heat in winter. At the same time it adds beauty and utility to conventional architecture.

Products Plant Operators are today changing over to the Vibrapac Use Agreement with assurance of greater profits per dollar invested. They know there's a big demand for VIBRAPAC block, and profits depend largely on the daily output . . . the total number of block that can actually be produced every 8-hour day with the smallest number of men. The Besser Super VIBRAPAC provides continuous, full capacity operation. It is designed, produced and serviced by skilled craftsmen . . . men with a broad experience in this specialized field.

Write today for Vibrapac literature and information on Vibrapac Use Agreement.



Besser Manufacturing Company nation-wide sales and service organization . . . a group of highly trained men who are capable and willing to help products plant operators produce higher quality block on a faster, more efficient production basis. Photo taken at recent NCMA Convention.

BESSER

Complete Equipment for Concrete Products Plants

BESSER MANUFACTURING COMPANY • ALPENA, MICHIGAN, U. S. A.

Metz Brothers Baking Company, Sioux City, Iowa. Engineer — W. E. Long Company, Chicago, Illinois; Contractor — W. A. Klinger Co., Sioux City, Iowa; Pozzolith Concrete supplied by Ready Mix Concrete Co., Sioux City, Iowa.
Over 25,000 sq. ft. of Masterplate Floors in flour storage building and receiving dock.

OTHER MASTER BUILDERS PRODUCTS IN WHICH CEMENT DISPERSION IS EMPLOYED

EMBECO...
For non-shrink grouting and re-integration.

MASTERPLATE...
For "iron-clad" concrete floors —industry's toughest floor.

MASTERTEX...
Cement-base paint of low permeability for protecting and decorating exterior and interior surfaces of concrete and masonry.

OMICRON MORTARPROOFING..
For tight brick walls. Provides good workability with 15-20% less water, correct water retentivity. Contains stearate.

POZZOLITH CONCRETE
Means Better Buildings

Pozzolith Concrete means better buildings because it means concrete work which has high strength, low permeability, good appearance and great durability.

These qualities are the result of the cement dispersing action of Pozzolith which (1) puts more of the cement to work (2) makes available optimum air content (3) conforms with the water-cement ratio law.

Because of these benefits, plus economy, over six million cubic yards of Pozzolith Concrete were placed in 1949.

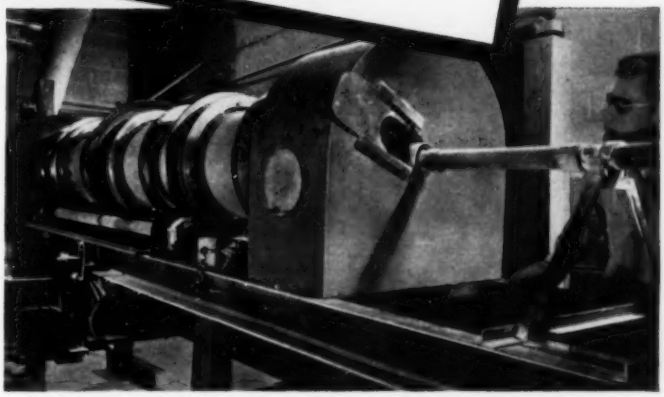
Full data on Pozzolith, and ACI and ASTM procedures for design, specification and production of concrete, on request.

the MASTER BUILDERS Co.

CLEVELAND 3, OHIO TORONTO, ONTARIO

ALLIS-CHALMERS BASIC INDUSTRIES
RESEARCH LABORATORY

A scheelite ore is being fed to a 322 *Hydrocone* crusher. Note automatic reset on right side of crusher.



8-in. by 12-ft rotary kiln is suitable for tests at various feed rates, speeds and slopes.

New 32-page Booklet Describes Research Facilities Available for Rock Products and Cement Industries

WANT TO KNOW COSTS of a process *before* full-scale production? Need laboratory engineering information that will guide you in designing a *more efficient* plant?

To help answer vital questions such as these, a new booklet — the picture story of the Basic Industries Research Laboratory — defines the types of research available, contains a record of investigations plus an important section about costs and a complete description of the testing equipment available.

Pictures shown here are of typical crushing and pyro-processing tests.

In addition to laboratory-scale testing operations, the Laboratory is available for complete pilot-scale crushing, grinding and concentration operations on quantities of feed ranging from 10 to 20 tons per day.

If you are engaged in or associated with the basic industries processes, we would be most happy to send you a copy of this valuable booklet. Write your nearest Allis-Chalmers district office.

Hydrocone is an Allis-Chalmers trademark.

FREE! Send Today

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Please Send New Laboratory Bulletin 07B6419B

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Company .....

Position .....

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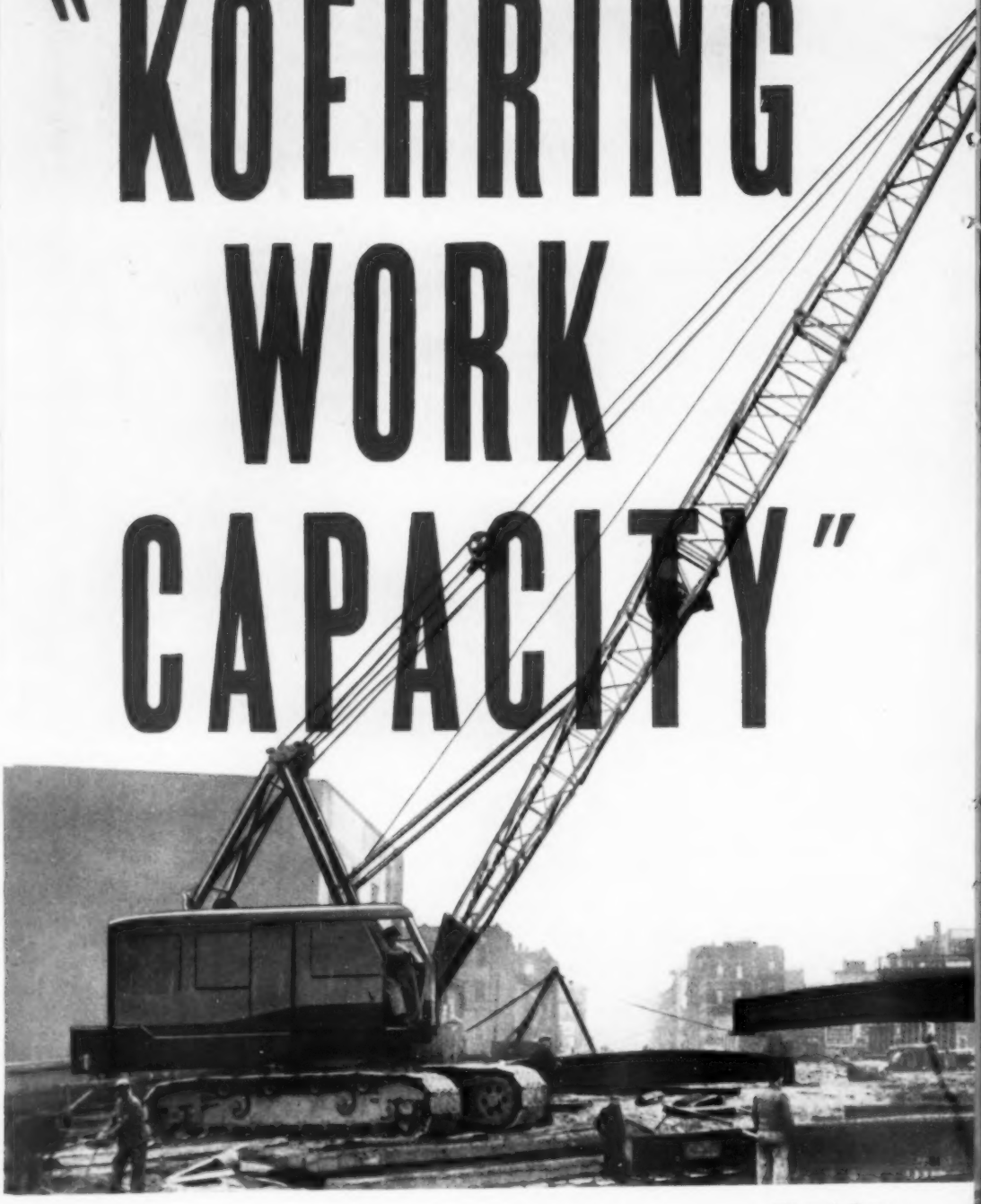
City A-3105

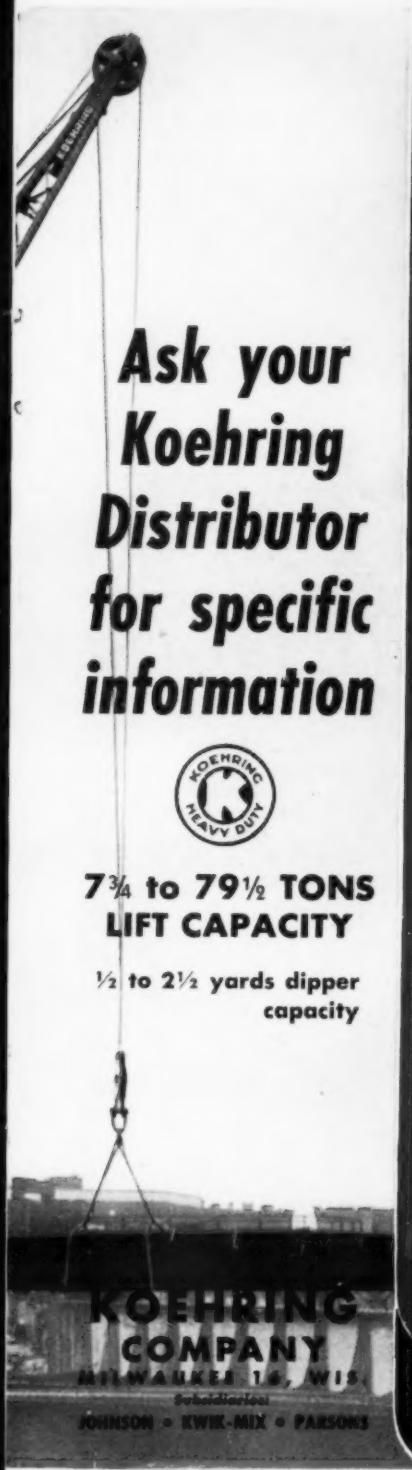
ALLIS-CHALMERS

Basic Industries Research Laboratory — Dedicated to a Better Utilization of Our Raw Materials

Measure by

"KOEHRING WORK CAPACITY"





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7¾ to 79½ TONS LIFT CAPACITY

½ to 2½ yards dipper capacity

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Subsidiaries:
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Johnson

EXTRA TONNAGE at NO EXTRA COST

FASTER OPERATION

Large diameter sheaves, with fully sealed needle bearings, reduce friction power loss, deliver full power to cutting lips to provide faster, smoother operation.

BIGGER LOADS

Because all-welded construction improves bucket balance and lowers center of gravity, Johnson bucket teeth dig in straight and deep. Deep, big bites get capacity load every time, in any material.

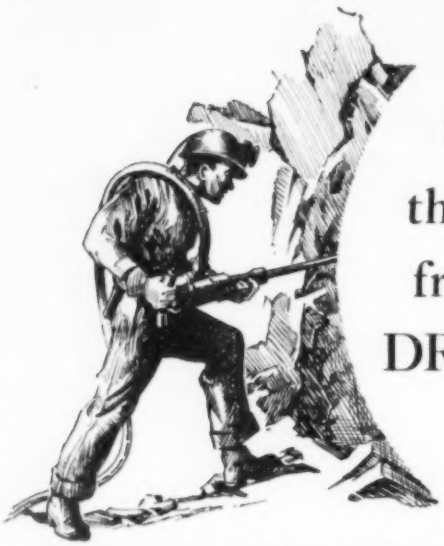
LONGER LIFE

Stronger and longer-lived because all-welded construction, by saving weight on other parts, permits use of heavier lips, heavier sides, heavier bottoms. Open lower sheave frame keeps sheave spaces clean; material cannot collect under sheaves. Hard manganese cutting edge, welded to heavy lips, actually gets tougher with use.

⅛ to 2½ yard sizes. General Purpose, Wide Rehandling and Heavy-duty Digging Type.

Write today for illustrated catalog.

THE C. S. JOHNSON COMPANY
KOEHRING SUBSIDIARY CHAMPAIGN, ILLINOIS



Getting the MOST from your DRILLING ?

ROCKMASTER blasting pays you MORE PROFITS PER DRILL HOLE!

The ROCKMASTER blasting system changes a lot of thinking about drilling blast-holes, because it enables the explosives in each hole to do more work! Many blasters today are saving from 20% to 40% of their former drilling costs—and saving important money on dynamite, too—since putting the ROCKMASTER system into effect in their quarries, mines or construction operations.

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In terms of drilling, this usually means that drill holes can be spaced farther apart. Or, it might mean you can use less dynamite with your regular spacing. Drilling for secondary blasting is usually cut way down, frequently eliminated altogether.

Write for booklet showing typical ROCKMASTER loading patterns for various types of blasting work. Or, better yet, call in the Atlas representative and let him tell you frankly what ROCKMASTER blasting can do for you.

Less Bark *More Bite*

ROCKMASTER TIMINGS

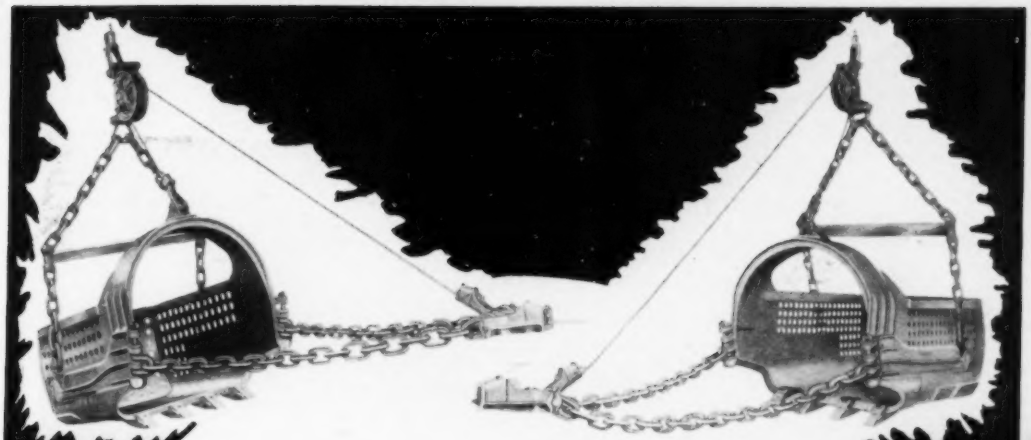
Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

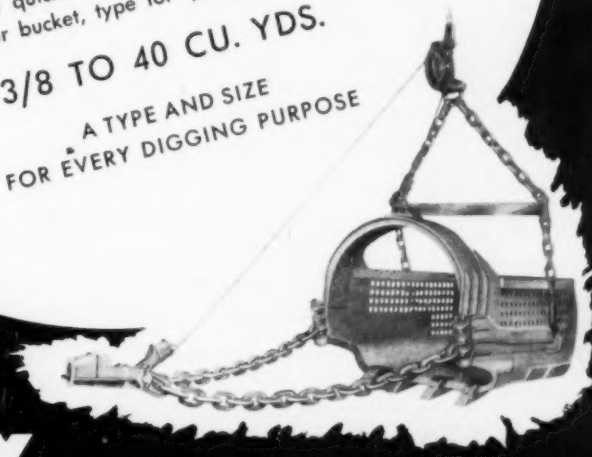


ENDLESS ENDURANCE

Hendrix Dragline Buckets are favorites with owners and operators because of their proven ability TO STAY ON THE JOB! This is the result of expert engineering, superior workmanship, and higher quality materials that go into every Hendrix bucket. Gruelling performance tests in the field prove Hendrix Buckets can stay on the job longer . . . move more dirt quicker . . . produce more profits than any other bucket, type for type or size for size!

3/8 TO 40 CU. YDS.

A TYPE AND SIZE
FOR EVERY DIGGING PURPOSE



HENDRIX
Lightweight
DRAGLINE
BUCKETS

For descriptive literature ask your dealer or write

HENDRIX MANUFACTURING CO., INC.

MANSFIELD — LOUISIANA

PORTABLE BELT

CONVEYORS

BELTS — 16" TO 24" WIDE

LENGTH — UP TO 60 FT. CENTERS

Another "MODEL 17" Conveyor with 24" belt, 60 ft. lg. stockpiling aggregate in northern Illinois. The unit is driven with a 4-cylinder, 11 to 22 HP, Wisconsin engine through an enclosed gear and shaft drive to head pulley, handling up to 160 cu. yds. per hour.

Write for the name of our nearest distributor to secure a recommendation on your requirements.

ATLAS CONVEYOR COMPANY

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IT'S TRUE . . . ONLY HOMER HEAVY-DUTY Permanent "non-electric" Magnetic Pulleys are guaranteed to equal or exceed the performance of electro magnetic pulleys of same size and capacity.

HOMER Heavy-Duty Pulleys available in standard diameters from 12" to 30", with belt widths from 4" to 60". Write for descriptive data.

Homer The HOMER MANUFACTURING CO., Inc.

DEPT. I-52 LIMA, OHIO

Producers of Magnetic Separator Equipment Since 1923

PERFORATED METAL SCREENS

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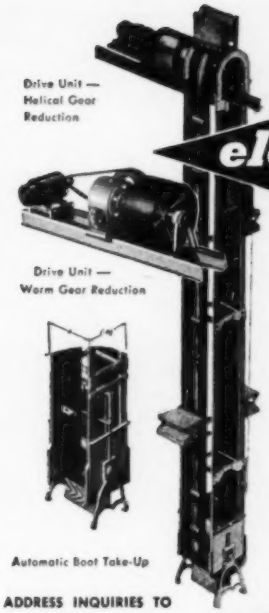

EHRSAM employees elevator ... saves you money

By speeding up inter-floor communication. *No waiting* — another step passes in a few seconds.

Takes up little space. Installation costs are moderate.

Handy *manual control rope* and an *automatic safety stop* guarantee safe operation.

The EHRSAM employees elevator is made in three belt widths, 12, 14, and 16 inches, and with 3 and 5 H.P. drive units. Special designs available for handling bags and boxes. Write today for more complete information.

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PREFORMED gives you

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MORE ECONOMY

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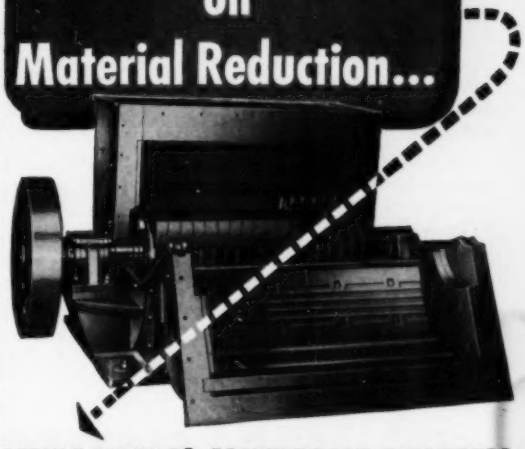
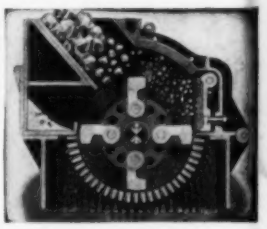
For Cost Reduction on Material Reduction...



WILLIAMS' "HEAVY-DUTY" HAMMERMILLS

Built to take 6" feed and reduce to agricultural limestone, ¾" stone and other small sizes in *one operation!* Crushing occurs on unusually heavy breaker and grinding plate before reaching grate. This permits grates to be used for sizing only, minimizing wear. The result; more output, more quickly reduced at less operating cost.

Sectional view of Williams "Heavy-Duty" hammermill, with heavy liners and grinding plate for limestone and other hard material. Particular attention is directed to the grinding plate adjustment which assures uniform close contact of hammers and grinding plate at all times. Also note the metal trap which provides an outlet for the escape of tramp iron.



WILLIAMS ALSO MAKES...

Heavy-duty hammermills in smaller sizes for all quarry operations; impact and roller mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "packaged" crushing and grinding plants.

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.
802 ST. LOUIS AVE. — ST. LOUIS 6, MO.

WC48-8

WILLIAMS

CRUSHERS — GRINDERS — SHREDDERS

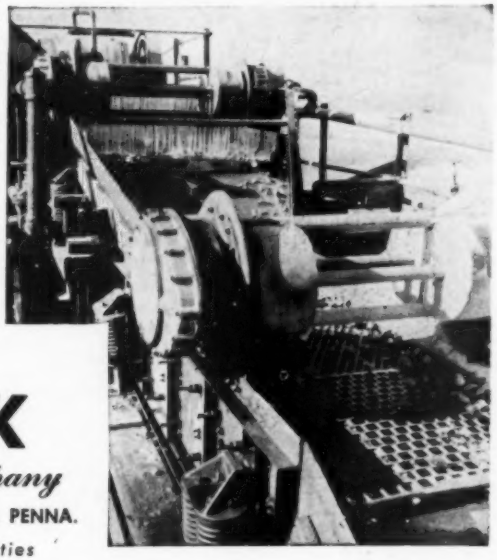
Heat-treated for the tough job

For especially tough screening jobs, Hendrick Perforated Metal Plate is heat-treated to increase its resistance to abrasion. It's ideal for vibrating and shaking screens, because it maintains uniformity of mesh throughout its unusually long service life.

Furnished either flat or corrugated, its full clearance obviates clogging, and the ease with which decks can be changed minimizes labor costs.

Available with any desired shape of opening, Hendrick Perforated Metal Plate can be supplied in the proper gauges of tank, high carbon, high tensile, and abrasive-resisting steels, and in other commercially rolled metals.

Write for a copy of new edition of Hendrick Perforated Plate Catalogue.



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Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

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$2.95 Ea. for $5.50
Army Khaki
Navy Grey
sizes 14-17

TROUSERS
$2.95 pr.
ARMY 8-2
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2 pr. $5.70
Sizes 29-42
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New Regulation Officers Chino
TROUSERS $3.75pr. NAVY GRSY SIZES ARMY KHAKI 29 to 42
SIZES 44, 46, 48, 50—$4.50, P.P. 15c each

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Suntan Tropicals	$6.35	Pinks & Greens	$6.95
Suntan Gabardines	$6.85	Sizes 14 to 17	P.P. 15c ea.

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100% Wool Sun Tan Tropicals	$10.85	
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100% Wool Greens	$10.85	

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Please No C.O.D.'s

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BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute strain uniformly.
★ Made of Steel, "Monel," "Everdur." Also "Promal" top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

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BROADCAST and SECTION

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Cement Plants
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Operating Costs

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Let me know what you have to dispose of and your immediate needs.

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3 Compartment concrete batching bins with scale and hopper
2 16 S Concrete mixers
3 Mortar Mixers
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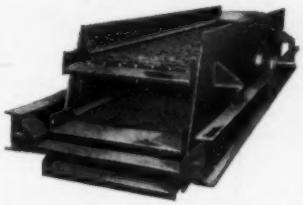

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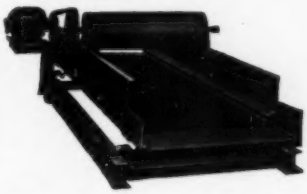

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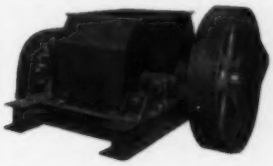

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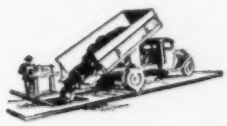

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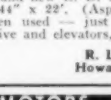

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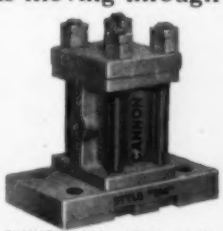

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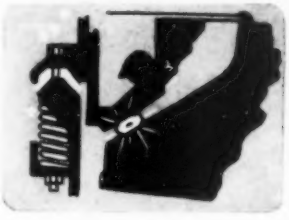

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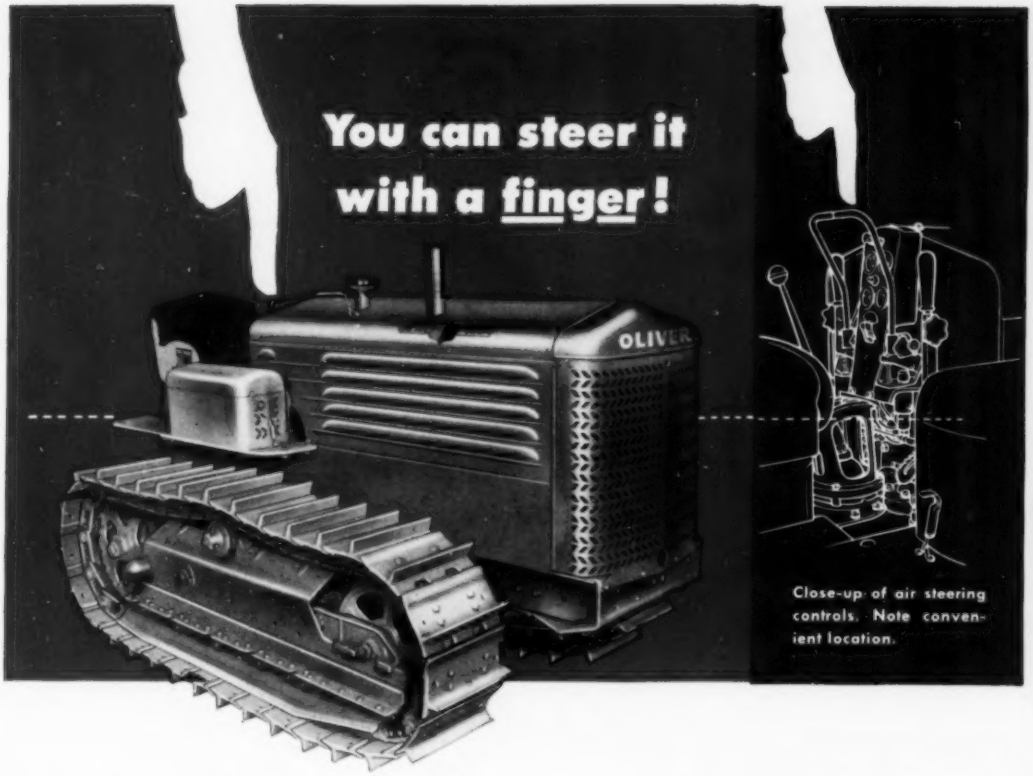

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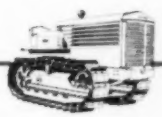

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